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THE MAIN BUILDING, VIEWED FROM THE NORTHEAST
RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO
RICHARD E. SCHMIDT, GARDEN & MARTIN, *ARCHITECTS*

The Research and Educational Hospitals of the State of Illinois

Richard E. Schmidt, Garden & Martin, Architects

THE conception and development of an idea which involves a building is the why of the plan. Ideas generally follow well defined lines and can be segregated into groups, the individual members of which have but little variation—thus precedents are formed. This stabilization of ideas is desirable and necessary to progress, as it gives a basis from which departures safely can be made. When a plan is developed which has unusual elements and arrangements, it becomes especially interesting to understand the why of the plan. In order to comprehend this, the conception and development of the underlying idea must be explained.

The plans for the Research and Educational Hospitals of the State of Illinois are unusual in many respects. This is due largely to the combination of elements not usual to hospital designing. The existing state hospitals for the insane were found by Mr. Charles H. Thorne, director of the Department of Public Welfare, to be places where patients were housed and given only incidental treatment. Apparently no effort had been made along the lines of research and preventative treatment. The logical conclusion is that, as the population of the state increases the capacity of these institutions must be enlarged in a like ratio and actually in an increasing ratio, thus adding to the burdens of the state to provide for its unfortunates. Mr. Thorne has stated that "it

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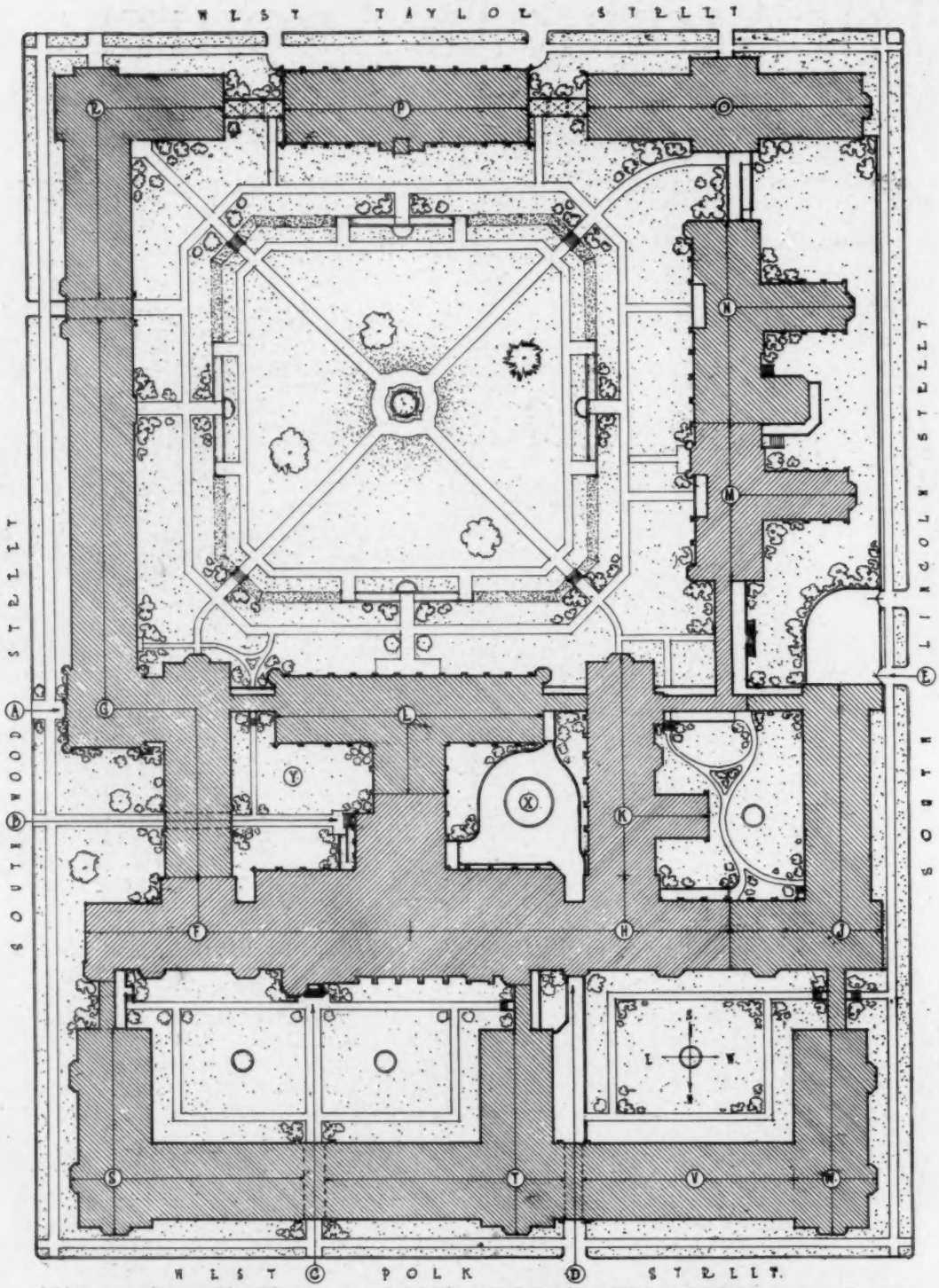
WEST TAYLOR STREET
SOUTH WOOD STREET
SOUTH LINCOLN STREET
WEST POLK STREET
RESEARCH & EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS
EDGAR MARTIN, SUPERVISING ARCHITECT - RICHARD E SCHMIDT GARDEN & MARTIN ASSOCIATE ARCHITECTS
BUILDINGS NOW UNDER CONSTRUCTION
SCALE
100 FEET
FUTURE DEVELOPMENT
(A) ADMINISTRATION. ENTRANCE (B) OUT PATIENTS ENTRANCE (C) STUDENTS & NURSES ENTRANCE (D) AMBULANCE ENTRANCE (E) KITCHEN ENTRANCE
(F) CLINICAL INSTITUTE. (G) EXTENSION OF CLINICAL INSTITUTE (H) EYE & EAR INFIRMARY. (J) EXTENSION OF EYE & EAR INFIRMARY.
(K) PSYCHIATRIC INSTITUTE (L) ADMINISTRATION BUILDING (M) ORTHOPEDIC INSTITUTE. (N) EXTENSION OF ORTHOPEDIC INSTITUTE.
(O) INFECTIOUS DISEASES (P) POWER PLANT (Q) VENEREAL DISEASES. (R) RESEARCH INSTITUTE (S) LIBRARY. CLASS ROOMS & RESEARCH LABORATORIES.
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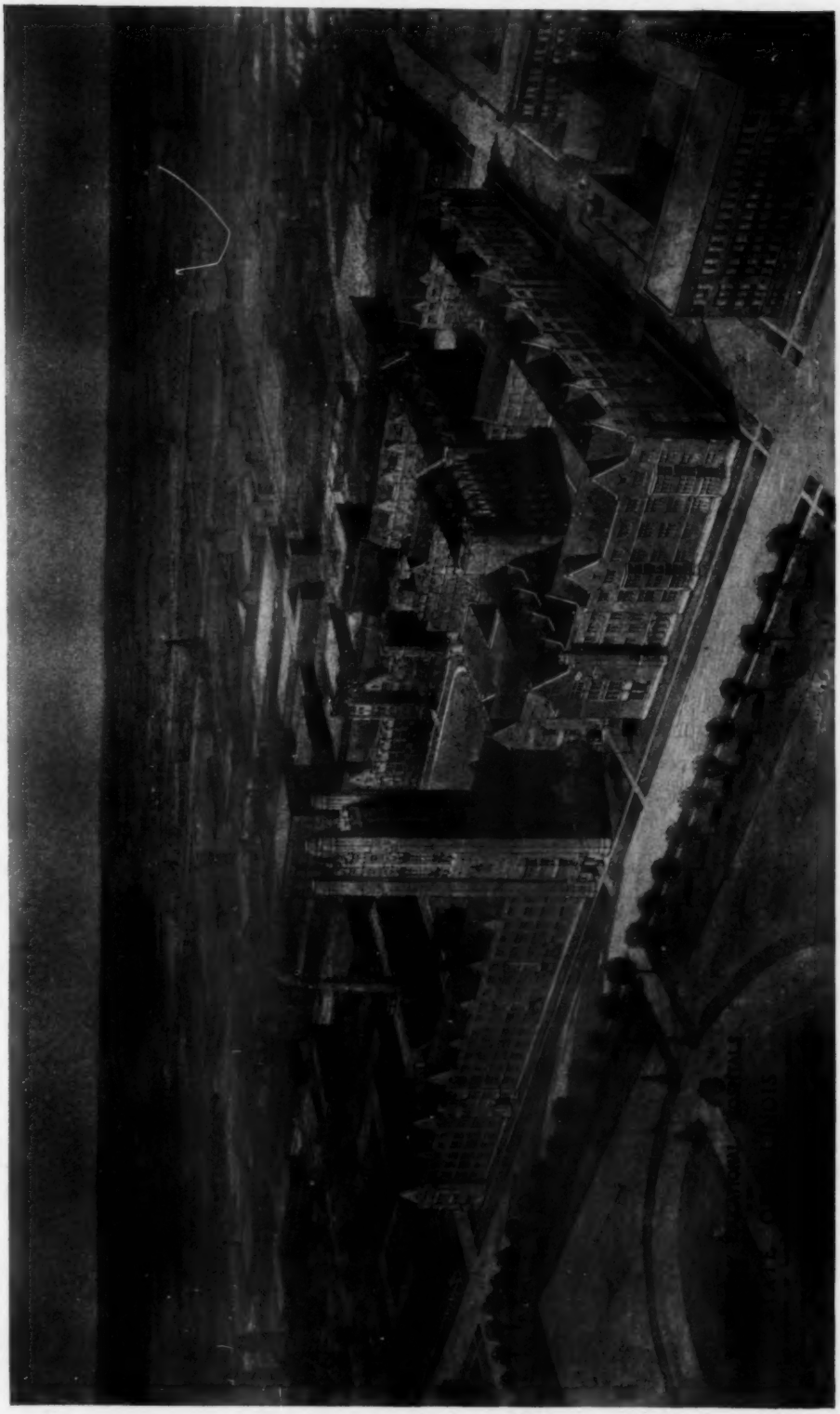

BIRDSEYE VIEW FROM THE NORTHEAST
RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO
RICHARD E. SCHMIDT, GARDEN & MARTIN, *ARCHITECTS*

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seems obvious enough that any activity, whether state or private, which spends one-fifth of its revenue upon a single thing, should know something about that thing and should spend a considerable sum for the purpose of ascertaining causes, with the idea of reducing the cost. Why has not the state conducted research for humans with the same interest as it has for hogs? This has been a current question in Springfield for some time, and I think the answer is that research on hogs has been conducted by the University, whereas the research on humans has been attempted by an administrative department which is not trained or equipped to do so."

It became patent that research must first be undertaken by a competent agency, and that it was not the function of the Department of Public Welfare, an administrative organization. The College of Medicine of the University of Illinois is organized for the purpose required and it needed exactly the things the Department possessed—namely, hospitals. A joint agreement was entered into between the University and the Department of Public Welfare, obligating the former to furnish the professional service and the latter to undertake the administrative functions of the hospital group.

Prior to this, the rebuilding of the Illinois Charitable Eye and Ear Infirmary and the locating of a Surgical Institute for Children was under consideration by the Department. This condition was the cause of planning other activities so as to ultimately build a complete medical center. This will serve the purpose of affording every facility for research to determine the cause of and the development of methods for the prevention of disease. It will also serve as a source of those trained specialists needed by the Department. The general plan contemplates the housing of a school of medicine and dentistry with the necessary lecture rooms, libraries and laboratories; a clinical hospital wherein research work can be conducted in all branches of general medicine and surgery, including orthopædics and psychiatry.

Governor Lowden was most fortunate in securing the services of Mr. Thorne as director of the Department of Public Welfare. Although he was without knowledge of the subject, he was an executive of one of America's greatest mercantile establishments, a man of liberal education and culture, and entered upon his work unhandicapped by the traditions, precedents and bias of special training. Edgar Martin, supervising architect of the State of Illinois, and Richard E. Schmidt, Garden & Martin, associate architects, prepared the plans. The planning was done in co-operation with Dr. Albert C. Eycleshymer, dean of the College of Medicine, University of Illinois. The results so far achieved have more than justified their connection with the project and guarantees the successful completion of the undertaking.

The hospitals are being constructed on the site of the old West Side (Cubs) Ball Park, which has a frontage of 556 feet on West Polk street and extends 880 feet south to West Taylor street, and contains about ten acres. The hospitals will be erected in units, four of which are now under construction. The general layout is shown on the block plan. The research institute, library, class rooms and research laboratories and the dental institute will face West Polk street, with three wings extending south about 200 feet to the group of buildings now under construction. These are the clinical institute, the eye and ear infirmary, the psychiatric institute and the orthopædic institute. In the rear of this group will be located the administration building. A wing of the eye and ear infirmary will be between the psychiatric institute and the street. These buildings will cover about one-half of the site and enclose five large courts. The remainder of the site consists of a very large quadrangle about 350 by 375 feet in size, affording a suitable outdoor place for the patients. This is especially desirable, as the hospitals are located in a very congested district. On the west of this quadrangle is located the orthopaedic institute; on the south, from west to east, the infectious diseases building, the power plant and the venereal diseases building. The buildings on the east are not yet definitely apportioned. The quarters for the patients will face this quadrangle and the utility and service rooms will face the streets.

A study of the five entrances indicated on the block plan shows that there will be no interference in traffic. The ambulance entrance at "D" is inclined and the incoming patients are delivered at the basement level in an enclosed room. The turning court, "X," is also at the basement level and makes it possible to secure very well lighted rooms about its four sides.

In general the buildings will be three stories in height, with a basement pipe space, and a fourth story occupying the lower portion of the space enclosed by the pitch roof; an interesting structural device by which the roof load is carried on inclined struts resembling flying buttresses, with a curtain wall set back from the building line. This permits the development of this fourth floor or roof space with light and air equal to that of the floor below. It also provides a very desirable outdoor space. This is illustrated in the detailed sections. Communication over the entire area is secured by a system of corridors slightly below the level of the pipe spaces. In general, these corridors will be against the outside walls with ample light and air. The first floors are about five feet above the outside grade, making it possible to have basement windows above grade, without areas. All interdepartmental communica-

tion, passage of visitors, transmission of food, laundry and supplies will be through the communicating corridor system, thus insuring ward privacy and a minimum of interference.

The out-patient department will be, in most cases, the receiving department of the hospital. There will be chosen from the great mass of clinical material passing through it the selected cases to be transferred to the wards for future study and treatment. This source of supply for clinical material has caused the planning of the dispensary to receive special attention as one of the most important features of the scheme. The dispensary will occupy the entire first floor of the first section of the main building and can be extended into adjoining units to be built later. The general clinics will occupy the east half of the building, the eye and ear clinics the west half, the psychiatric and orthopaedic clinics the east and west halves of the psychiatric wing. From the main entrance at the rear of the center, the patients are distributed to the various waiting rooms as classified. Ample provision is made to effect the rapid passage of the patients through the various departments without interference and congestion. In fact, this department is so skilfully planned that it is worthy of careful study. Industrial architects plan to "route the product" through the factory. In like manner the product has been as carefully routed through this hospital. Its success effects economy in cost of operation, mental and physical effort. Elevators afford access to the X-ray department on the second floor and to the hydrotherapy and electrotherapy department at the basement level. A small lecture room, with a capacity of about one hundred, is provided for lectures and demonstrations for out-patients and for the use of students and nurses.

THE PSYCHIATRIC WING VIEWED FROM THE QUADRANGLE
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The wards are located on the second and third floors. These are kept small as best adapted for teaching purposes. A ward capacity of four beds was adapted as the proper size, with a floor area of 320 square feet, and this led to the choice of a bay 16 feet wide by 20 feet deep as the typical unit for the entire scheme. In the eye and ear infirmary a ward for eight beds is the unit. The second and

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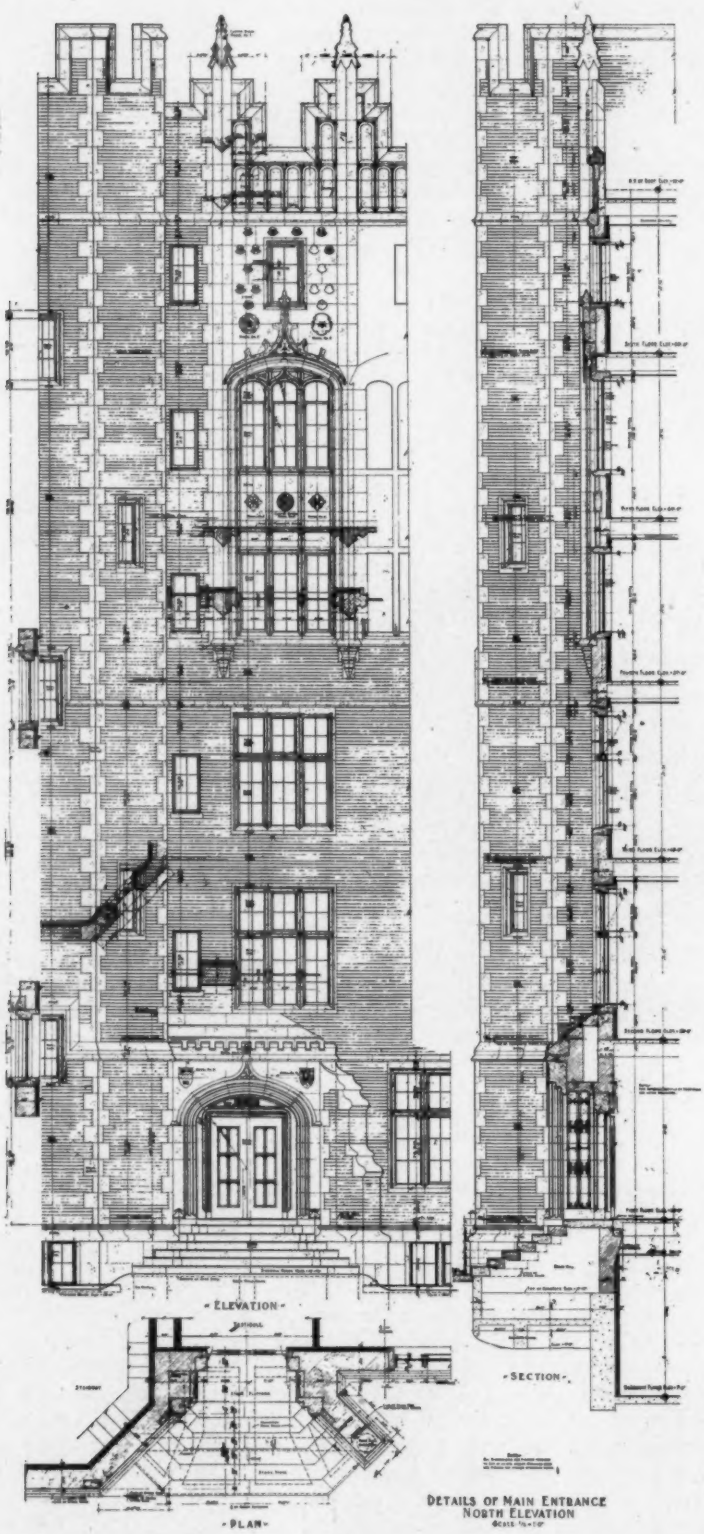

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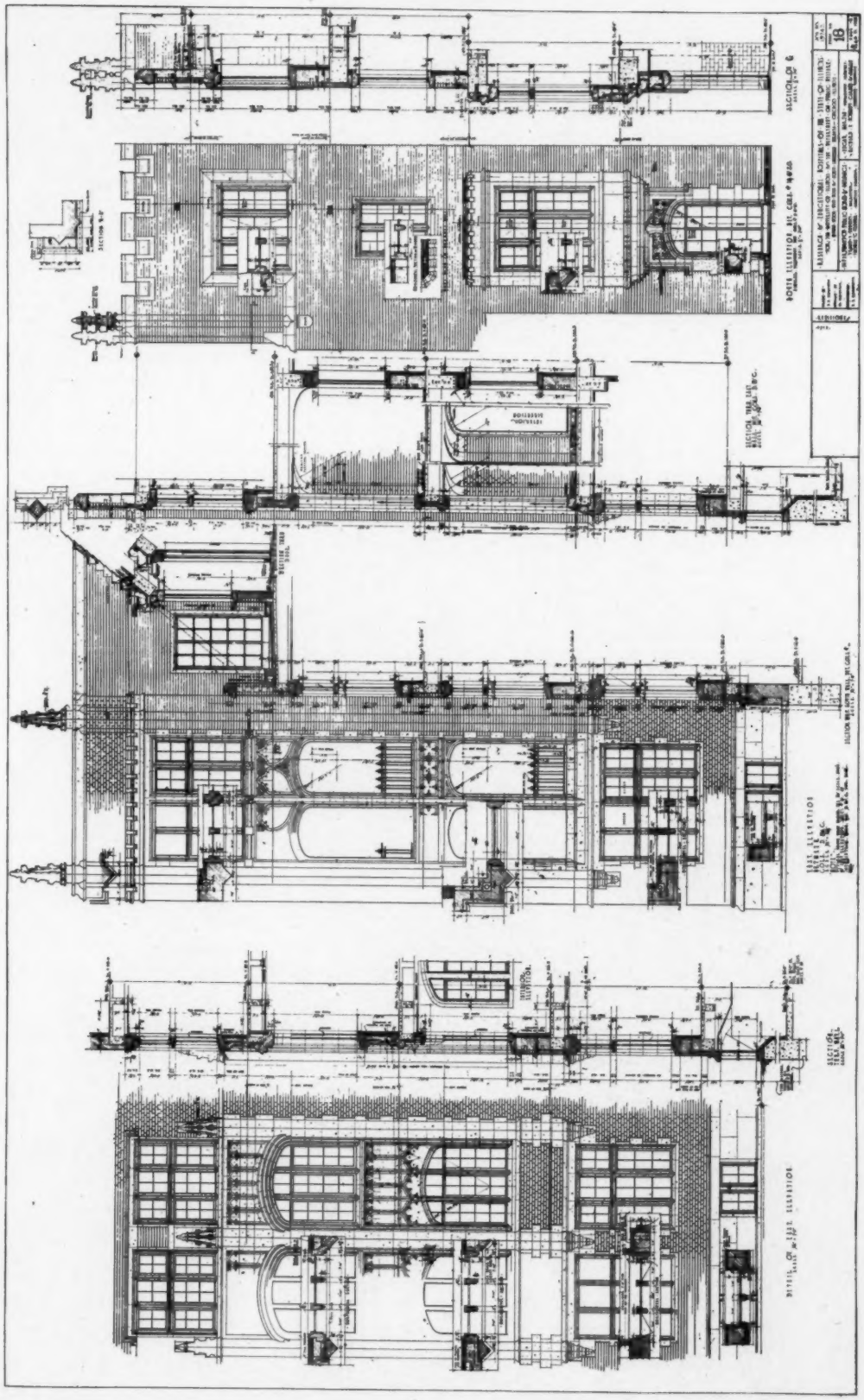

DETAILS OF MAIN BUILDING

RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO

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XUM

third floors of the psychiatric wing are assigned to male and female patients. The plan was governed by the special nature of the work and the space is divided in the reception quiet and disturbed wards. Access to the hydrotherapy department on the basement level and to the large solarium for occupational therapy and recreation on the fourth floor level is by means of elevators.

The central portion of the fourth floor is devoted to the operating department, which has a capacity sufficient for the entire group when completed. There are six operating rooms with side and top light combined and two smaller operating rooms with side light only, with all of the requisite utility and service rooms. The student amphitheatres seat from sixteen to forty each and access thereto is by means of stairs from the fifth floor. This keeps the operating corridor free from unnecessary traffic.

The eastern portion of the fourth floor is devoted to wards for children and infants; the western portion is used as day quarters for eye and ear patients and a small ward unit. In the psychiatric portion of this floor are research and demonstration rooms and two interns' rooms for the psychiatric staff.

On the fifth floor are wards for obstetrics and gynecology and on the sixth floor are quarters for resident physicians. Temporary quarters for interns are on the third floor of the main building in space ultimately intended for libraries and laboratories.

Each floor of the main building will have direct access to the corresponding floor in the buildings to be erected on the West Polk street frontage to contain the libraries, lecture rooms and laboratories of the medical school. The basic idea of the institution is the close association of the patient with the research physician and investigative worker, and by this means it will be accomplished.

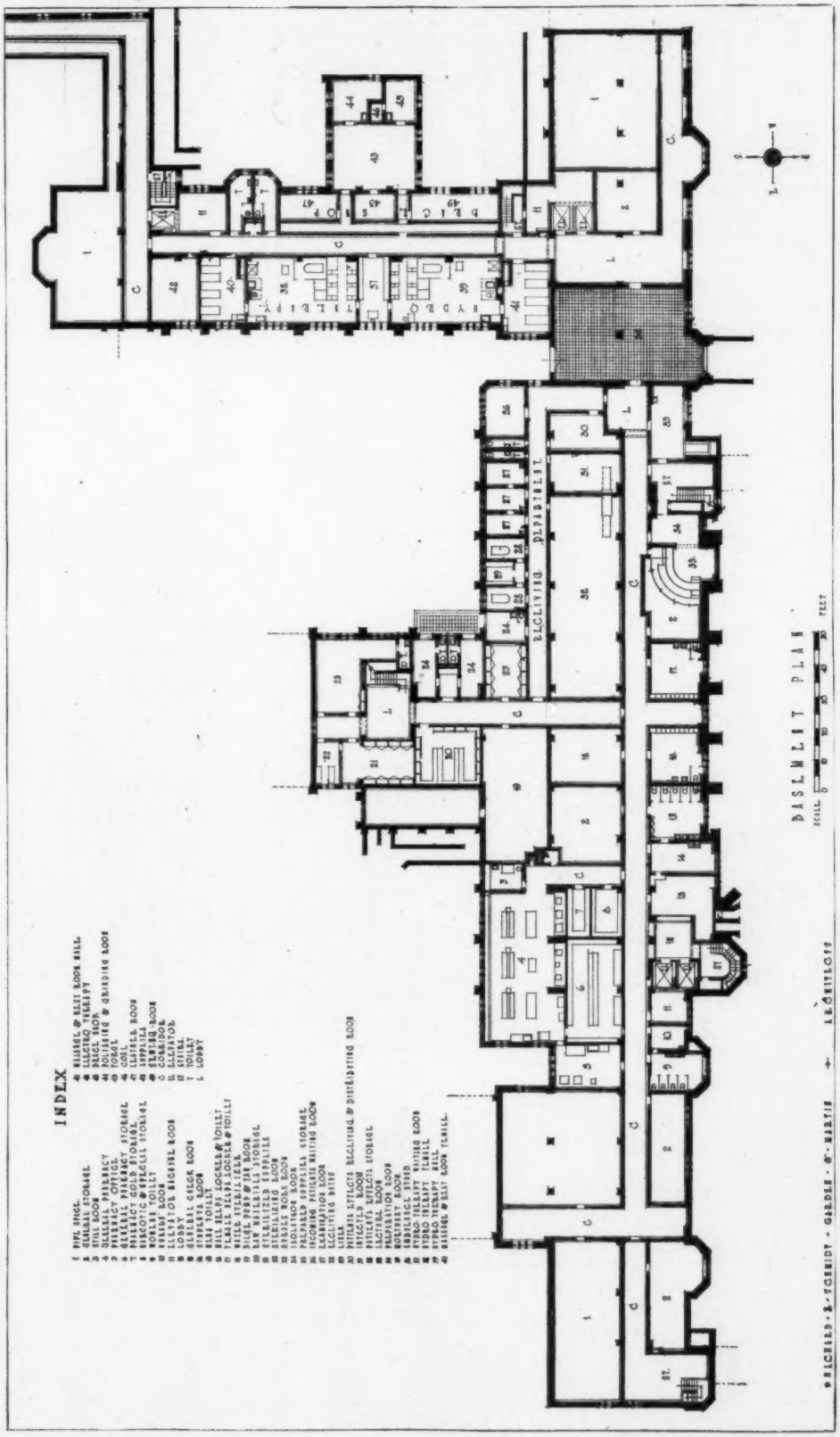
The ward pavilion type is desirable for the Orthopedic Institute, as the patients stay for a considerable length of time and in this way a greater number of patients are accommodated. The south wards are for girls and the north wards are for boys. The first floor is devoted to ambulatory patients, day rooms and dining rooms. The grade of the quadrangle at this place is raised to the first floor level in order that the wheeled chairs may pass out thereto without difficulty. The second floor is devoted to bed patients, the third floor is devoted to first and second observation wards. The fourth floor contains, in the central and southern portion, study and classrooms for manual training and other forms of occupational instruction, as well as instruction in grammar school grades. There is also a large kindergarten and playroom which is equipped with a stage for moving pictures and theatrical performances given by the children. All of these rooms open onto balconies and roof spaces through French windows, so that advantage can be taken of the open air and sunlight.

There are three isolation wards located in the north end of this floor, for the use of children who may develop contagious diseases and at the same time continue their orthopedic treatment. Each ward has its own serving pantry and combined utility, toilet and bathroom. Separate entrances for nurses and doctors with adequate facilities for the prevention of cross infection are provided.

The buildings are designed in a free adaptation of English collegiate gothic, which always has an atmosphere of peace and quiet particularly suitable for academic and hospital institutions. In this particular case the location is in a congested and not overly attractive district and the plan was made with a view to provide the sick and convalescent patients with the advantages of the quiet and sheltered courts and quadrangle. This group will be a welcome contrast with another large hospital group bedecked with an ostentatious display of columns, cornices, pediments and pavilions—typically institutional in aspect and indicating an opulent charity towards its inmates.

The exterior walls are faced with a wire-cut Illinois brick which presents a variety in color and texture to approximate the charming weathered effect of old English brickwork. Bases, string courses, copings and window trim are of Indiana limestone. A fire-flashed interlocking shingle tile, with predominating tints of purple and russet brown, is the roof covering. Ornamentation has been reduced to a minimum, dependence being placed on the proportion of parts and the proper selection and use of materials for effect. The buildings are of fire-resisting construction throughout and of the most permanent and durable character.

On the whole, these plans are of great interest to architects, whether they are directly interested in hospitals or not, to physicians and hospital managers and to the layman. A careful study of them discloses the clever and intelligent planning which, when fully comprehended, is appreciated. When completed, these hospitals will rank equal with any of their kind in America, if not in the world.



MAIN BUILDING

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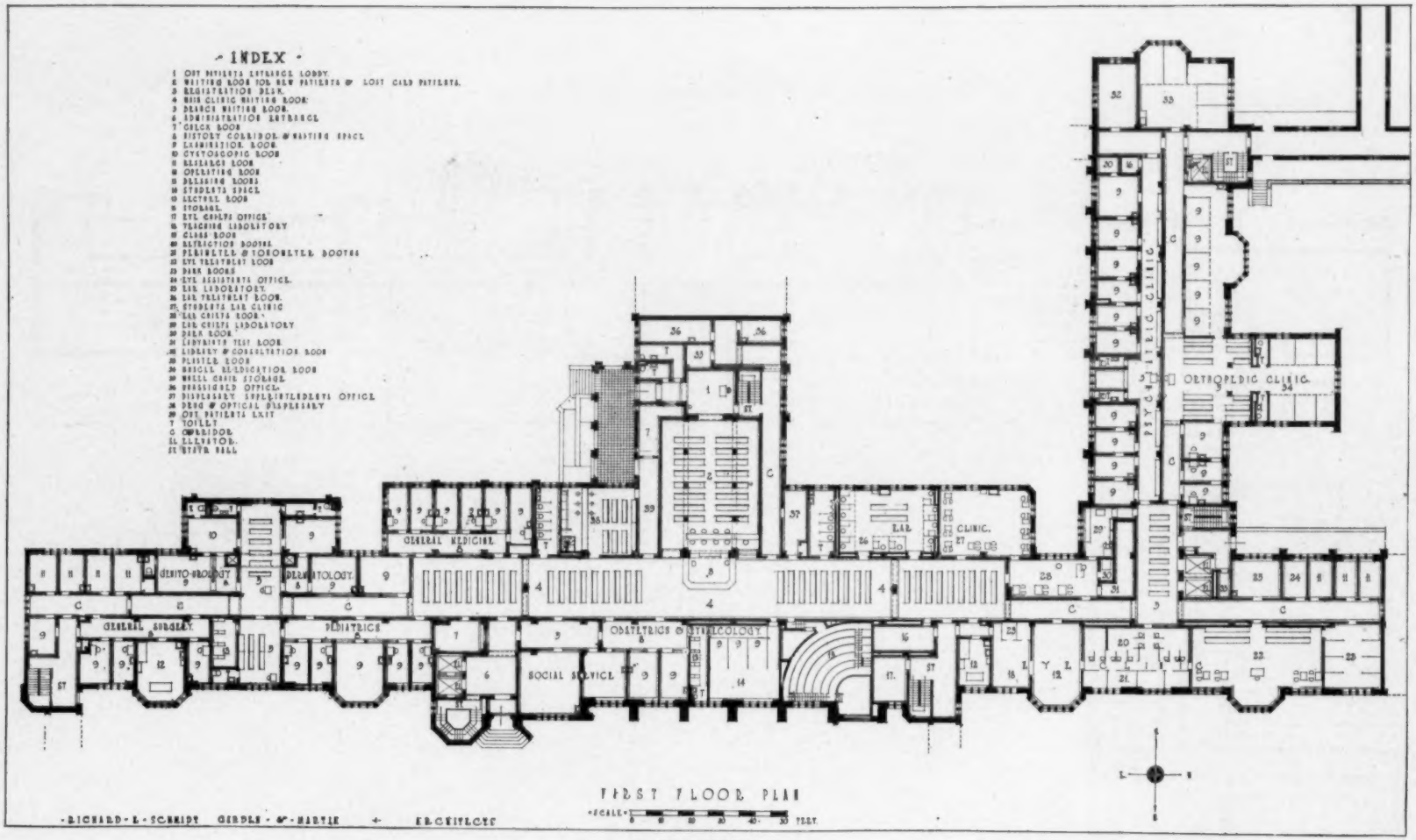

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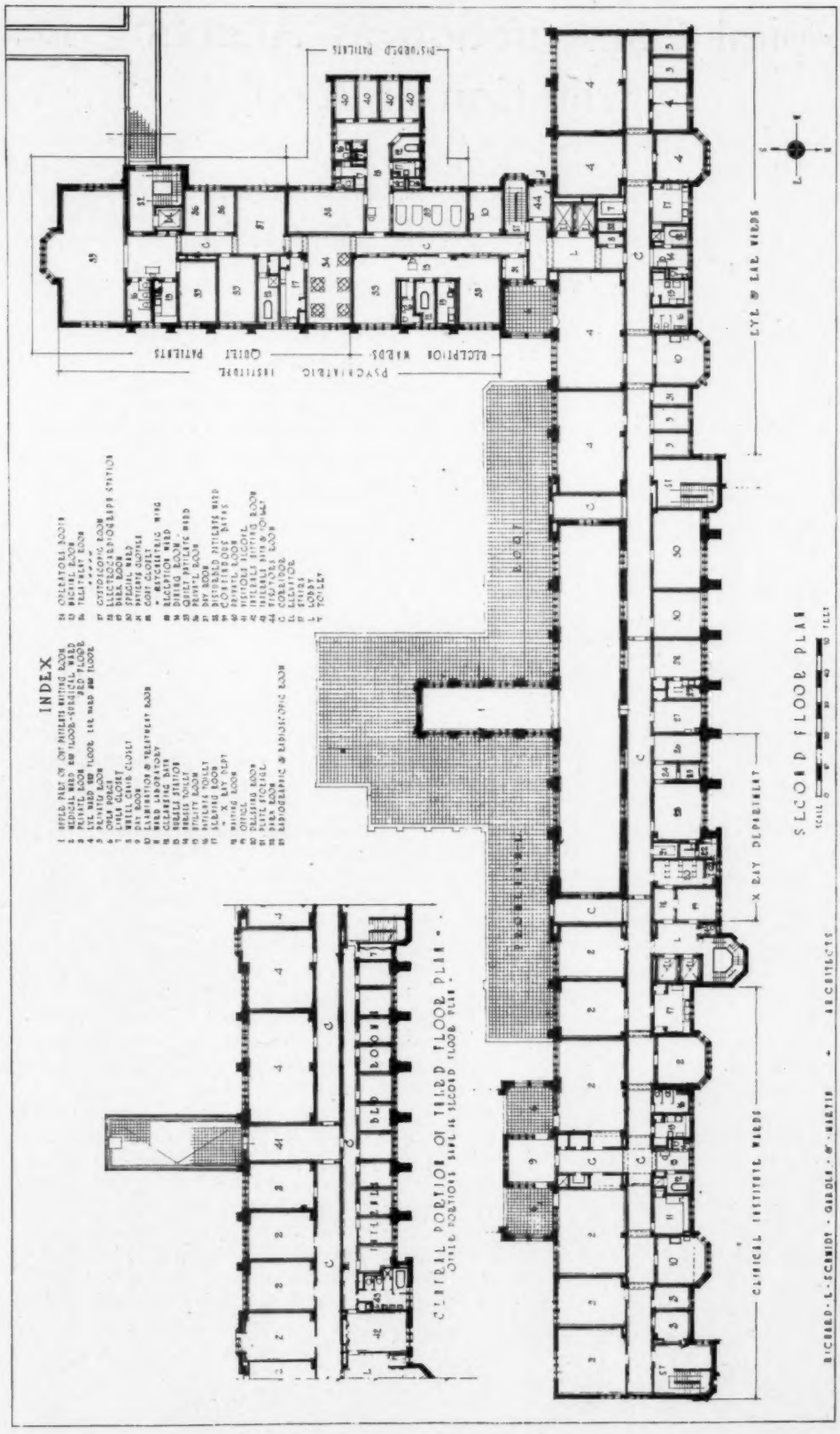

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XUM

Hospital Construction as Affecting Distribution of Food*

IN a development of the construction plans of a hospital the variety of phases to be considered are infinitesimal, but there is no one phase more difficult of correlation, no one phase meaning more to the future economical and efficient operation of the hospital, than the proper planning of the dietary department. This has by far the largest individual budget of any department in the hospital, and inasmuch as the physical layout is responsible to a large extent for its efficient or inefficient performance, too much care cannot be given to the proper planning of this activity.

It must be borne in mind that the institutional feeding problem is a rather complex one, covering serving of food to private patients, to ward patients, and to the hospital personnel, necessitating a very careful consideration of the methods of service in conjunction with preparation. A very common mistake is that of planning the dietary department and then attempting to fit a service to this plan, rather than approaching the problem in the logical way, by first determining the character of service and then fitting the plan around that type of service.

The centralization of all preparatory service is of course by far the most economical, and if it is possible with the type of institution to prepare and serve the personnel of the institution from the main kitchen, it should be done. However, there are certain developments in which this is not possible.

The location of the main kitchen is of paramount importance. There are three general locations: the top floor, the first floor, or in a separate building.

There are some few types of hospital buildings that lend themselves to a top floor kitchen development, but the scheme in general should not be encouraged. The top floor of a building is unquestionably the best floor for patients, and unless there are some unusual conditions that make a portion of this floor available for kitchen purposes better than for patients, this location is not advocated. In addition is the problem of transportation of such supplies as coal, groceries, ice, etc., and returning garbage, ashes, etc. In favor of this location, of course, is the fact that the odor from such a kitchen is less objectionable; but after all, if a kitchen is properly ventilated, this nuisance can be reduced to a negligible quantity. In a small hospital, unquestionably the best location for the kitchen is on the first floor, as near to the center of activities as possible, in order that the travel of food may be reduced to a minimum. The separate building for the large institution is very desirable, provided it can be properly correlated. Careful consideration must be given in any location to see that it will be possible to transport the food quickly and with a minimum loss of heat in transport.

Very little, if anything, can be said as to the size of the kitchen, this being dependent entirely upon the type of institution, the proportion of private to ward beds, etc. By all means, the size should be developed from a very thorough knowledge of the service to be performed, bearing in mind that unnecessary space necessitates unnecessary labor. If at all possible, and the desirability of making such a scheme possible is very great, the kitchen should be open on three sides. The ventilation of a kitchen suite is rather difficult at times. The efficiency of hoods, ranges, stock pots, etc., is a mooted question, and unless such a hood is supplemented by exhaust fans, both in the stack and in the hood, and in the openings in the kitchen proper, they are of very little value.

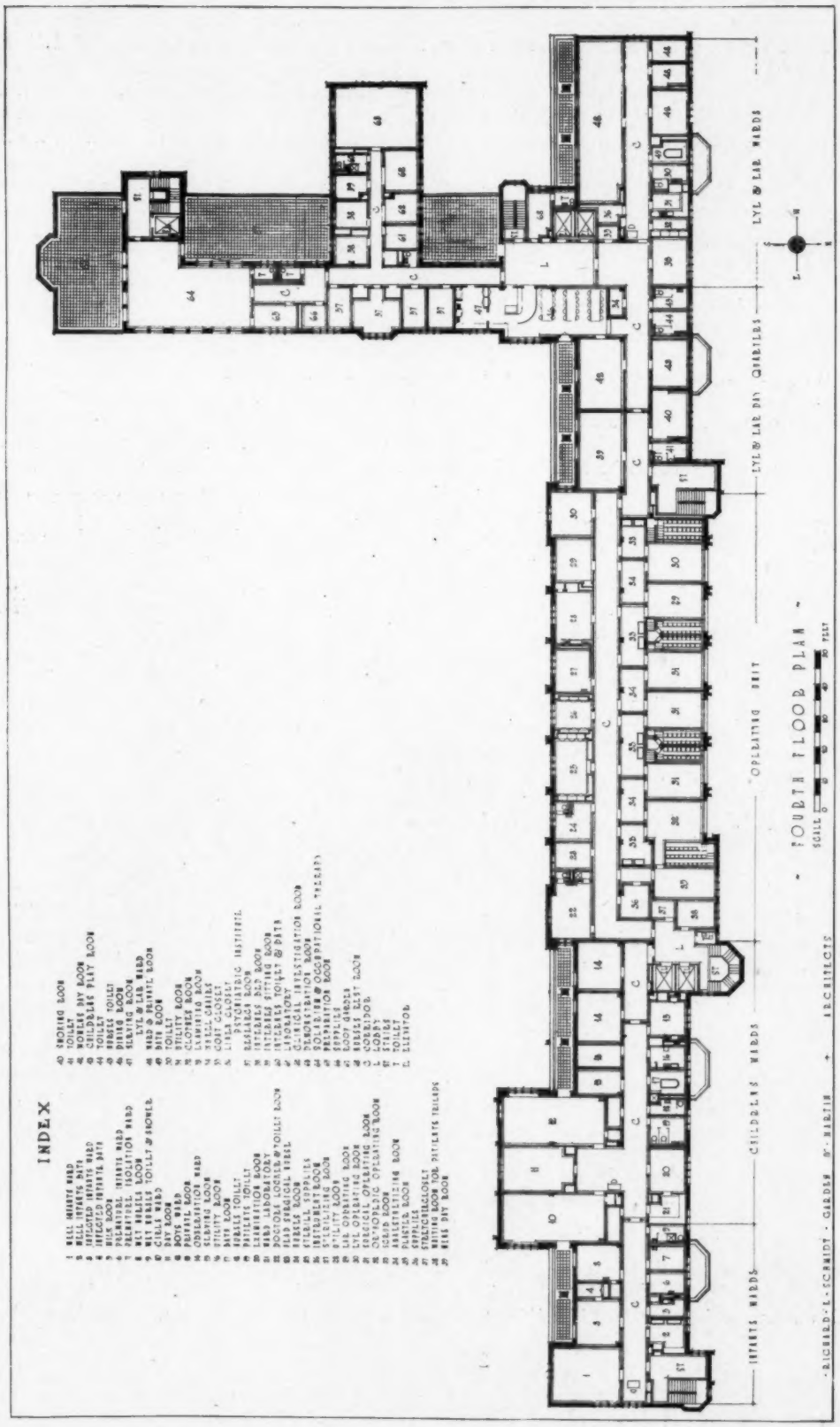
Too much attention cannot be given to this question of ventilation, nor the question of light. The walls should be of white tile if possible, not only for cleanliness' sake, but for the sake of better lighting.

The type of floor is important from a housekeeping point of view. Red quarry tile makes an exceptionally good floor. It is expensive, but the necessity for providing a floor that can be easily cleaned, and one that will wear well, indicates a very careful consideration of such a floor, or a floor of similar type.

For hospitals of one hundred beds or over, unquestionably there should be furnished separate pastry rooms, sculleries, meat and vegetables rooms, and cold and dry storage. With large units, additional rooms are indicated. The policy of having one room for the entire kitchen activity tends to confusion and is not productive of the best results.

By far more important than the actual equipment is its proper installation. A very efficient piece of equipment may lose its entire value if placed relatively in the wrong position in the activity. The whole kitchen operation should be studied with an institutional performance in mind, laying out the unit to permit the easiest possible performance. Hotel installation is not a good example to follow.

*Extract of an address read by Frank E. Chapman, superintendent of Mount Sinai Hospital, Cleveland, before the Twenty-second Annual Convention of the American Hospital Association in Montreal.



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The service required of a hotel kitchen is entirely different than that required of a hospital kitchen.

The installation of hoods over as much of the equipment as is possible is very desirable. This not only takes off odors, but has a very salutary effect on the temperature of the room, provided these hoods are properly connected up.

Too much emphasis cannot be placed on the installation of as many labor saving devices as possible. These not only conserve labor, but they insure economy in the distribution of foodstuffs.

The item of plumbing in the kitchen is a very important one. Care should be exercised to get sinks at the proper height from the floor, in order that the preparation of vegetables and washing of pots and pans may be done with the minimum of expended energy.

The question of open shelves or closed cupboards is a matter of personal preference. In any event, these cupboards or shelves should be adequate in capacity and easy of access.

The elevator service should be given very careful consideration. It is highly undesirable that foodstuffs be handled on the regular passenger elevators. By all means, electric dumb waiters should be installed, if dumb waiters are indicated. The personnel should not be compelled to labor with the hand operated system. Dumb waiters as usually installed are not sufficiently large to accommodate food carts. If food cart service is to be used as a routine, care should be taken to see that elevator service adequate to take care of these carts is installed in duplicate, in order to insure a continuity of service.

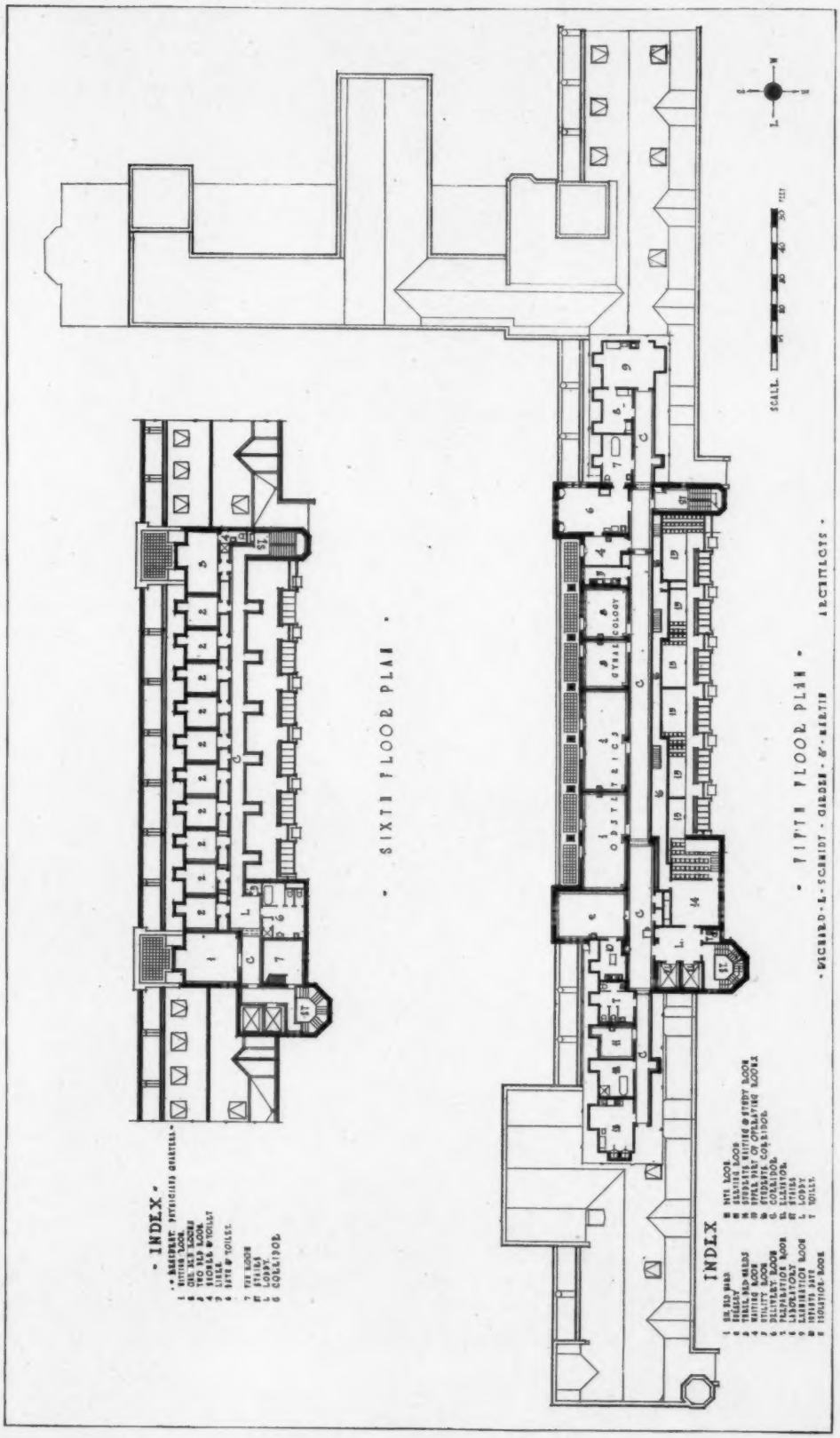
The special diet kitchen should definitely be a part of the kitchen activity and should be so located as to permit of easy supervision on the part of the dietitian. The same comments pertain as in the main kitchen. This room should be sufficiently large to permit of an efficient operation, depending entirely upon the type of service and the size of the institution. It should be equipped with stove, broilers, dish warmers, sinks, and cupboards. It would also seem, in an institution in which a large number of infant feedings are prepared, that facilities should be provided for a room which can be used for the preparation of special formulas. Such a room need not be very large, but should be so constructed as to be easily cleaned and ventilated.

The ward serving room is a very important unit in the dietary service, and should be given very careful consideration in planning. Its location should be near the center of the unit that it serves, in order to reduce to a minimum the amount of effort necessary to serve trays. It should be planned so that the elevator service should either come directly into this room or be very closely adjacent thereto. The flooring should be of a type that is easily kept clean and is non-absorbent. A fair size for a room of this character should be ten square feet per patient to be served, with a minimum of 150 feet floor space. The necessary equipment in such a room should include a refrigerator, a dish sterilizer for contaminated dishes, dish warmer, toaster, sink (double sink advocated), garbage receptacle, towel racks, cupboards, a tray rack of sufficient capacity to hold all the trays to be served, and a large work table with drawers.

The feeding of hospital personnel is an exceedingly difficult problem, and one that requires very close study to be satisfactorily worked out. In all events, the dining and service room should be located away from that part of the hospital containing patients, and should be varied in size and character, in order to serve the various classes of hospital attachés. As a minimum list of the types of dining rooms, the following is submitted: officers, interns, nurses, special nurses, office attachés, orderlies, domestic help.

A great many institutions have adopted the cafeteria method of service. While it is true that this is economical, and offers some very definite advantages over maid service, it is questionable if it is a desirable service. The hospital dining room is one of the few places of relaxation for the personnel of the institution. Most of these people have no other home than the hospital, and certainly standing in line for three meals a day, 365 days a year, has not the tendency of creating the homelike atmosphere that is desirable in a hospital. In any event, the location and equipment of serving rooms is dependent primarily upon the type of service that is to be rendered. If there is cafeteria service, the arrangement of commercial cafeterias may be copied, bearing in mind, however, that there will have to be at least two, and probably three, different serving rooms to take care of the various classes of attachés. It is extremely undesirable, in fact almost impossible from an administrative standpoint, to have all groups supplied from one serving room.

Food may be conveyed to patients by several methods: It may be taken by heated food carts, heated by hot water jackets or by electrical elements. This method is in very common usage. Such a cart has some very definite advantages; but it has one distinct disadvantage, *i. e.*, unless the food is handled very promptly, the injection of this additional heat in transit has a tendency to change the character of food by cooking it over and above the palatable state. This equipment does not, however, provide for the handling of cold foods, such as salads, desserts, etc. A new device on the market



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is a food cart constructed on the principle of the fireless cooker or vacuum bottle. The most perishable of foodstuffs placed in this cart will retain its character and heat for several hours. This equipment, from personal experience, is submitted as the most efficient method of transporting foodstuffs.

In conclusion, there is one primary thought that it is desired to convey. The best of raw material improperly prepared and improperly served is rank extravagance. If it cannot be placed before the patient in a condition to be eaten, it might better not have been cooked. The great trouble with hospital dietaries is that foodstuffs are primarily prepared with facilities that have not been planned for the service; and as a consequence the food is handled so many times that it is bound to be cold when served. In the planning of a hospital building, the importance of the dietary department should not be overlooked. It should be studied just as carefully as one would study the location and equipment of the operating room suite, and the results obtained will more than justify the efforts.

The Case for Modern Architecture

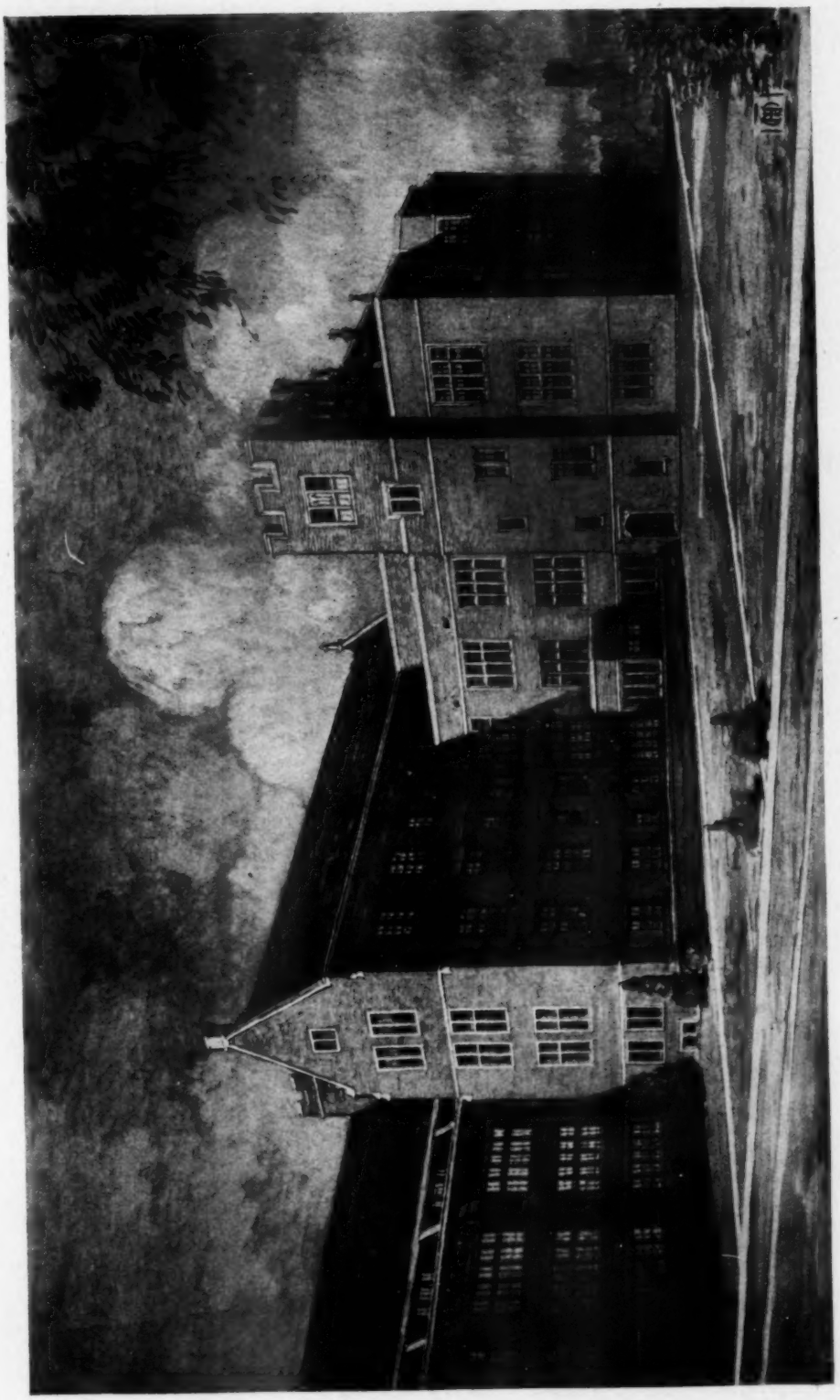
From an Address by JOHN W. SIMPSON, P.R.I.B.A.

TRADITIONAL education in design during the second half of the nineteenth century was disturbed—one might say bewildered—by a deluge of illustrated books and periodicals due to improved and cheapened processes of photography. The student, instead of having to select and make his own drawings of a chosen subject, thus found at his disposal a heterogeneous mass of information about buildings in every country and style. Though incomplete—presenting selected aspects only, of compositions which need plan, elevation and section to reveal their true meaning; and prone to emphasize the picturesque, rather than the greater qualities of our art—the material supplied was for the most part good of its kind, and we owe to photography many really valuable works of reference. The trouble was not so much the quality as the sudden profusion of varied suggestions, confusing to the receptive mind, overtaxing its capacity for absorption and digestion. In effect we have lived through an age which has collected a vast deal of new knowledge, some superficial, but on the whole profitable. Our fathers hardly strayed outside the classic groves of Greece and Rome, save for excursions into the field of Italian Renaissance, a passing glance at its French manifestation, and perhaps a somewhat inappreciative survey of the Gothic cathedrals. We, cheaper and easier travel abetting, have had spread before us an architectural panorama of the whole world through seven thousand years of time. Egypt, Crete, China, Japan, Mexico, India, to say nothing of Spain and the less-visited parts of Europe. The result may, or may not, be something unexpected, but we see already a wider view prevailing of what constitutes tradition, a shedding of prejudice and much experimental reproduction of exotic work; tentative efforts to find seemly clothing for new needs, to which neither toga, trunk hose nor periwig can be suitably adapted.

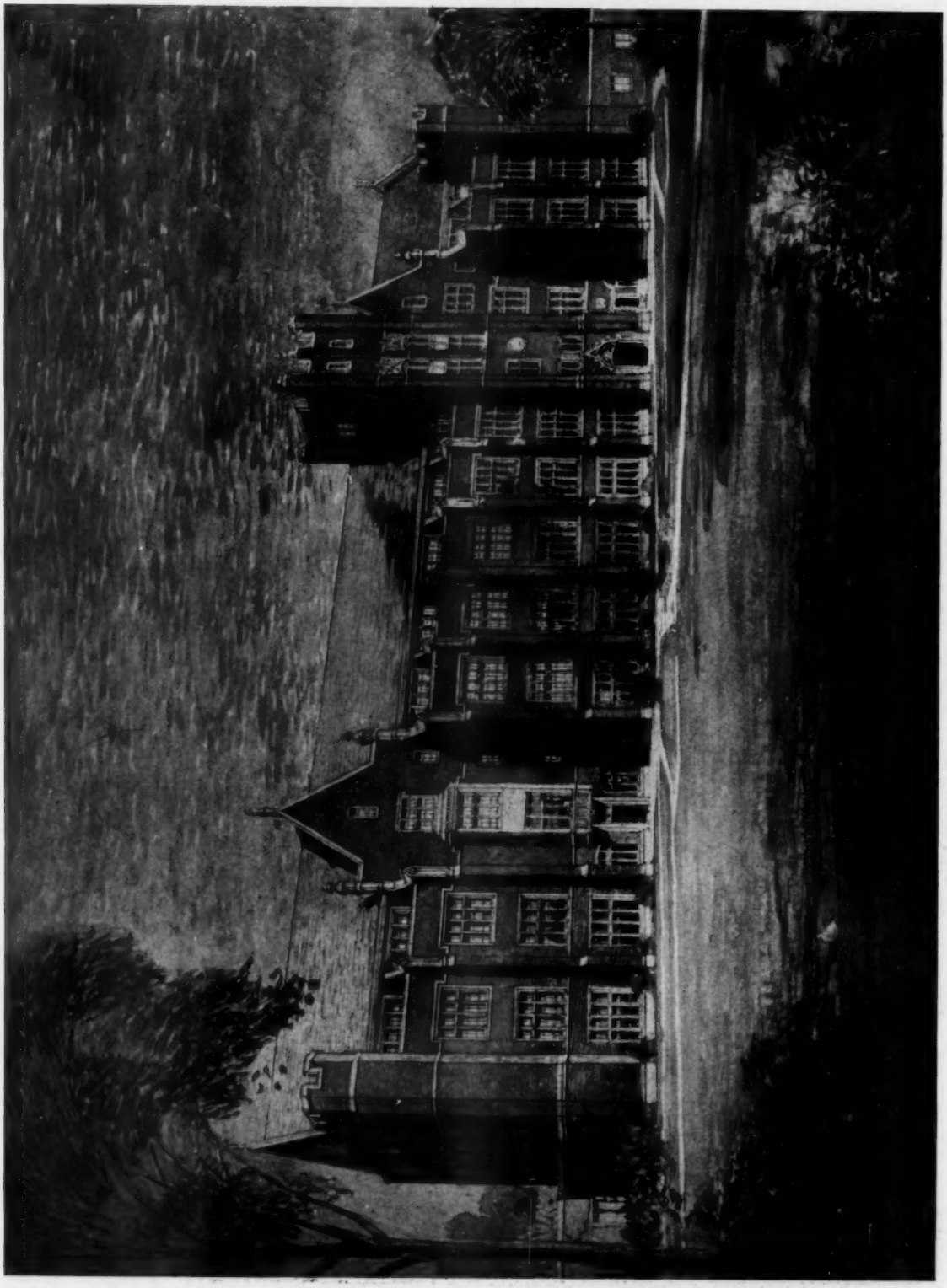
These "new needs" form perhaps the chief reason for the change from what was deemed traditional design. Educational and commercial requirements, for example, have altered materially since our boyhood, and have to be frankly recognized and provided for.

Incompetent criticism, like any other public duty ill performed, has evil results. Persistent depreciation of contemporary and recent art is, in great measure, responsible for revolutionary efforts to break away altogether from the past, to find a new and short road to æsthetic expression. Exasperated by incessant taunts, unbalanced minds are stampeded from the quiet fields of honest study into the frantic eccentricities which, now and again, astonish us—and vanish into oblivion. The classic track is no easy one, they are told it leads nowhere, and lack the faith to follow it to fruition. Architecture has been perhaps less disturbed by the clamour than has sister arts; its solid ballast of utility has steadied it; but architects, too, are disquieted by demands for originality, for a "national style," by assertions that "the old was better," by accusations of being mere copyists. We need not take the outcry too seriously. The middle period of the nineteenth century is still the common quarry of æsthetic hawks, but the work of its earlier years is now discovered to be better than was supposed; Gower street, built in 1826, is no longer the type of the unlovely. Let us hear what Heine, an accomplished critic and admirer of London, who was here at the time, thought of its architecture. "These houses of brick," he writes in his *English Fragments*, "become of a uniform brown color; they are all of the same style of building, generally two or three windows wide, three stories high, with small red tiles above which remind one of newly extracted, bleeding teeth; the broad and accurately aligned streets seem to be bordered by endlessly long barracks. Rich speculators, to meet

(*Concluded on page* 243)



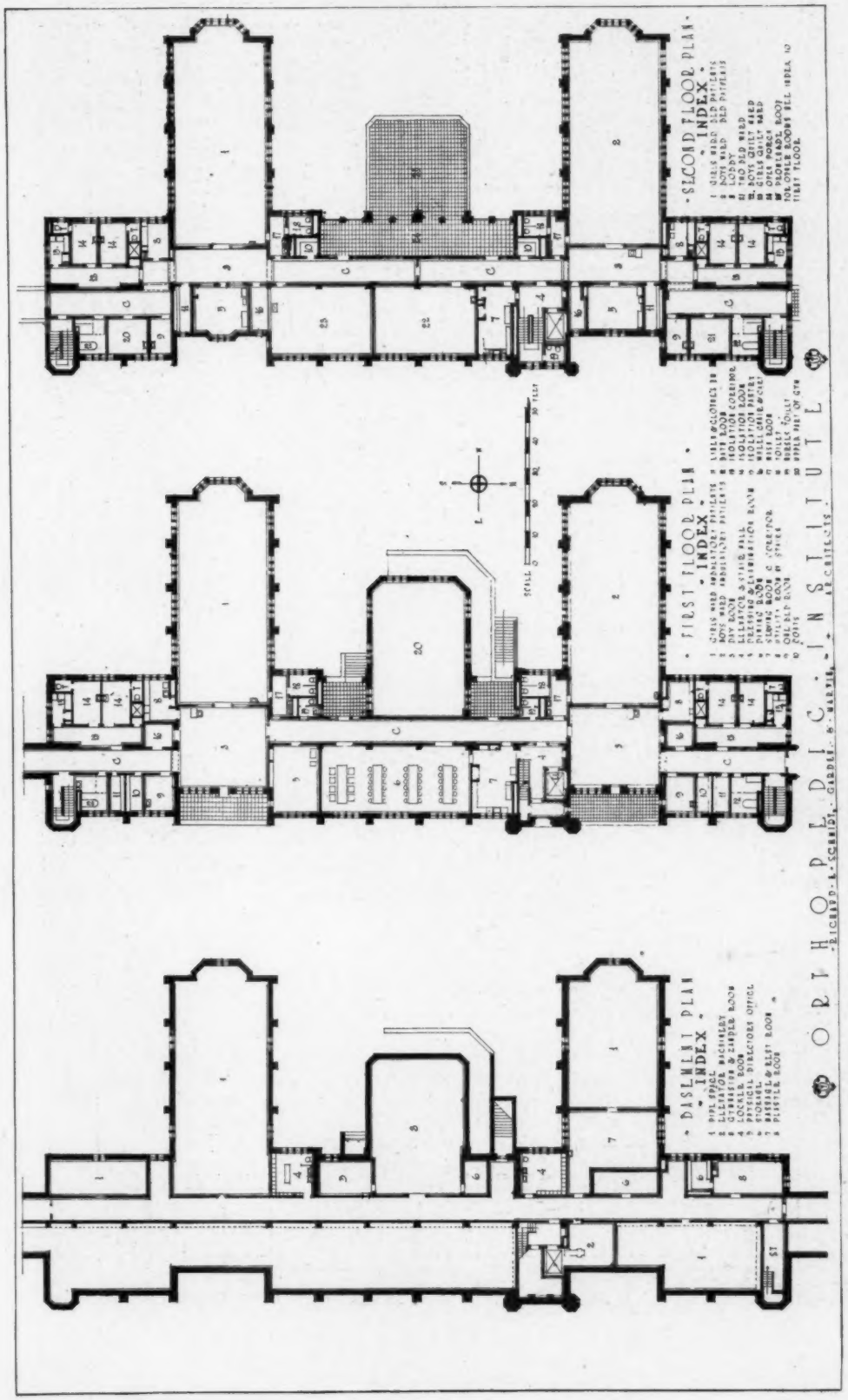
THE PSYCHIATRIC WING VIEWED FROM THE SOUTHWEST
RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO
RICHARD E. SCHMIDT, GARDEN & MARTIN, *ARCHITECTS*



ORTHOPEDIC HOSPITAL AS SEEN FROM THE QUADRANGLE

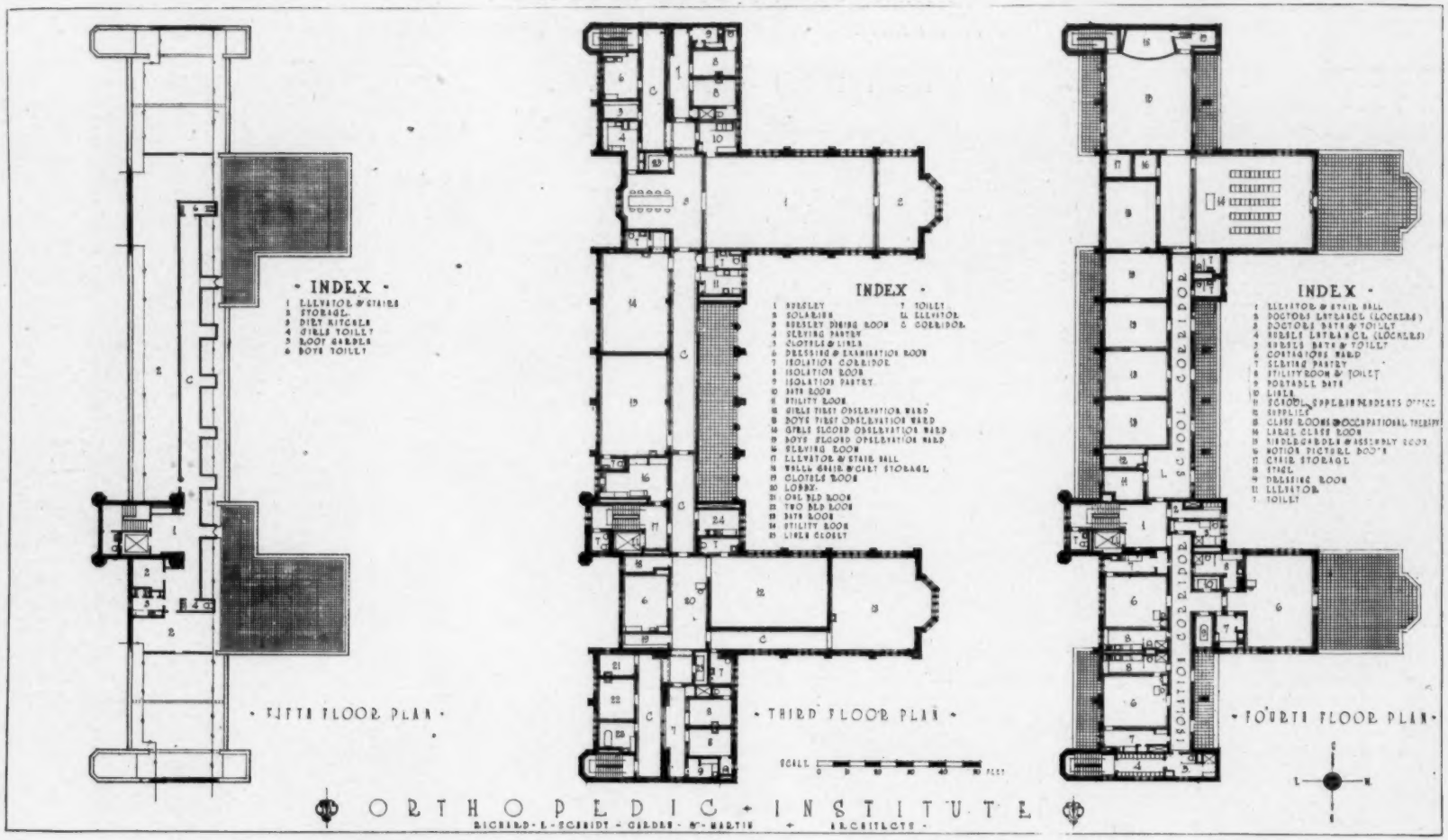
RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO

RICHARD E. SCHMIDT, GARDEN & MARTIN, *ARCHITECTS*



RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO

RICHARD E. SCHMIDT, GARDEN & MARTIN, *ARCHITECTS*



RESEARCH AND EDUCATIONAL HOSPITALS OF THE STATE OF ILLINOIS, CHICAGO

RICHARD E. SCHMIDT, GARDEN & MARTIN, *ARCHITECTS*

The Case for Modern Architecture

(*Continued from page 238*)

the demand, build wholesale entire streets of these dwellings, which they retail singly. At the west end, where the more aristocratic and less-occupied world lives, this uniformity is still more dominant; here there are very long and broad streets, where all the houses are as large as palaces, outwardly anything but distinguished, unless we except the fact that in these, as in all the better class of houses in London, the windows of the first story are adorned with iron-barred balconies, and on the ground floor there is also a black railing, protecting the entrance to certain cellar apartments buried in the earth. In this part of the city are also great squares, where rows of houses, like those already described, form a quadrangle."

It is no new thing, this eulogy of the past and disparagement of the present. We may doubt if any artist is justly appreciated till long after he is beyond the reach of praise or blame; some may be overrated, others are certainly underrated, "the idols of past generations crumble suddenly to dust, while the despised and rejected are lifted to pinnacles of glory." This is most true of architecture, for it is the mirror of our own life, and the reflection is too clear to be flattering.

My address must necessarily, I fear, be deemed illogical. An artist must be convinced of the rightness of his work, for without faith is no enthusiasm; a doubter can never achieve a great creation. If, then, he can so detach himself from conviction as to be able to compare the work of dead Masters with his own, to survey dispassionately the past and present, he is no artist, and has no more claim to attention than the casual layman! The syllogism is irresistible; I offer you my thoughts; you will form your own conclusions. For my part, I shall prudently evade the consequence of the argument and make no reference to the work of living men.

In determining the merit of modern architectural work there are certain actualities to be taken into account, if we are to arrive at a true judgment. To these, as it seems to me, sufficient attention is not given by those—whether technicians or lay writers—who attempt to define the quality of recent design in relation to the standards bequeathed by the great ancestors of our calling.

As for "national style," whether it be good or bad, it clearly exists. No one could mistake a British city for one of any other country; our national signature is written all over it. It is nevertheless possible that we are on the verge of such a new departure in our art as has taken place in the art of warfare, where "fighting," in the historic sense, with the development of guns and swords, seems likely to give place to mere destruction by misuse of the products of peaceful industries. In our case it may well come about by frank recognition of the qualities of the machine, as opposed to obsolete methods of hand work. There is nothing inherently uncongenial in the association of machine work with architecture; the real incongruity is in attempts to maintain, or revive, mediæval craftsmanship in the twentieth century. Its charm lay in its spontaneity, its unaffected fitness for the surroundings of its date; to imitate it is to fabricate artificial flowers, which lack life and perfume. We live in an age of machines, and true architecture must needs reflect their influence. If we set ourselves to the planning and constructing of buildings supremely proper for their purpose, art will take care of itself. An artist will always solve his problem artistically. Finding inspiration in stern Utility, he transmutes it by his touch into

"Some fragment from his dream of human life,
Shaped by himself. . . ."

The question of "originality" is bound up with that of comparison. Ecclesiastes, you will remember, pointed out that "The thing which hath been, it is that which shall be; and that which is done is that which shall be done; and there is no new thing under the sun. Is there anything," he asks," whereof it may be said, See, this is new? it hath been already of old time which was before us." In this sense, originality is, of course, impossible; on the other hand, the permutations and combinations of the eternal elements of architecture are beyond number, and I take the demand for original design to mean no more than for a fresh disposition of walls, doors, windows, roofs, their proportions and decorations. Here arises a curious point in support of the words of Solomon, who, you will also remember, "praised the dead which are already dead more than the living which are yet alive," for quite other reasons than those of our critics. If a building could be imagined which should be wholly original in design, neither its merit nor its demerit could be appreciated by the human mind. It would speak an unknown tongue; and there would be no standard by which to compare it. It follows that in every design must be repeated some known forms or features whereby we may interpret and recognize the composition. Here is the reason why old work, the masterpieces of antiquity, must be studied with assiduous care and exactitude, lest our knowledge of them be imperfect, and tradition debased by inferior reproduction.

XUM

Old Tavern, Rossville, Staten Island

(See reproduction of original drawing by O. R. Eggers on opposite page)

Stage coach and tavern days were picturesque ones during our Colonial period. With our present facilities for safe and quick journeys over long distances it is difficult to realize with what trepidation and great preparation our forefathers set about the trip from Philadelphia to Boston.

Now a matter of hours, then a journey of weeks, the venturesome traveller, we learn, was wont to make his will, set his house in order and bid his family a tearful good-bye. It was only the rich and important who could afford the expense of these long stage coach trips and it is for this reason that these taverns are in a sense historical landmarks.

At one time or another they have sheltered the great men who were active during our Colonial period.

The tavern at Rossville on Staten Island, picturesquely presented by Mr. Eggers' skillful pencil, is on the one time direct route between the southern and northern colonies. It was along this route that Washington journeyed when he set out for New York to take the oath of office as first President of the United States.

In its architecture the tavern at Rossville follows traditions of Dutch Colonial types. In fact it may be regarded as an excellent example of that period. Much of the picturesqueness of Staten Island has now disappeared and this old tavern is but a suggestion of what it was when all the village turned out to greet the arrival of "The Coach" and stare open-mouthed at the passengers alighting to stretch their legs after the long run from Trenton to find in the low-ceilinged tap room the refreshment that would ease their fatigue and fortify them to continue their journey.

OLD TAVERN, ROSSVILLE, STATEN ISLAND, N. Y.
THE AMERICAN ARCHITECT Series of Early American Architecture

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MAR 9 '21

XUM

EDITORIAL

Improving Farm Conditions

CONSIDERABLE space has been given in these pages during the past three years urging on the agricultural departments of the various states the necessity for action looking toward the betterment of the architectural aspect of farm buildings and the conditions surrounding the life of agricultural workers.

It is gratifying to note that this important matter is being seriously considered by the Department of Agriculture in Washington and that the offer of co-operation on the part of the American Institute of Architects has been promptly accepted. Through its various chapters in the agricultural states, the Institute will be able to afford the government the most valuable assistance and if the subject is kept alive we may early look for a decided improvement in the types of farm building and the consequent betterment of the social conditions affecting farm life.

While most of th argument advanced as to the betterment of farm buildings has been to persuade men either to stay on the farm or to return to farm life, it must not be forgotten that the farm will be no lodestone for men unless it is also for women. A farm home survey recently made by the Department of Agriculture shows why it is not attractive to women.

More than 10,000 farm houses in thirty-three states were surveyed. The working day of farm women was found to average 11.3 hours the year round. These long hours were due to the lack of ordinary facilities and the poor equipment and planning of the houses. What is needed to make the farm attractive is that its houses and their equipment shall more nearly approach those in town. The development of trolley systems and of motor transit has enabled the farm worker to become more closely associated with town life. The comparison they make is all against the farm. We shall not be able to effect the desired result until we have made the home surroundings of the farmer attractive.

A National Archives Building

A BILL recently introduced by Senator Smoot, prohibiting smoking in public buildings but touches the rim of an important matter, a deplorable condition to which this journal has many times directed attention. During the last two months, fire has destroyed one state capitol and has done $2,000,000 worth of damage in the Census Bureau.

It is small wonder that the State Department should show uneasiness over the possible loss that would occur in the State, War and Navy Building in the event of a fire. In addition to the valuable and irreplacable documents stored in this building, there rest in a safe which in the judgment of the National Board of Fire Underwriters would not stand a severe fire, the original copies of the Declaration of Independence and the Constitution of the United States. If by any chance fire should destroy these, the loss would of course be irreparable and this country would stand before the world as recreant to a solemn duty.

In 1914 Congress passed an act authorizing the construction of a fire-proof Archives Building, where the invaluable records of the various departments not only might be stored secure from destruction by fire and water, but where they could be scientifically arranged and made available for the use of those to whom their use is valuable. Notwithstanding that authorization, however, under which the Government was empowered to acquire the property and to construct the building, and notwithstanding the fact that a preliminary appropriation for the drawing of plans has been made by Congress, and that the necessary appropriation has been estimated for by the Secretary of the Treasury from year to year, Congress has failed to make the appropriation.

Patriotic people in this country will feel easier in mind when Congress acts in this important matter.

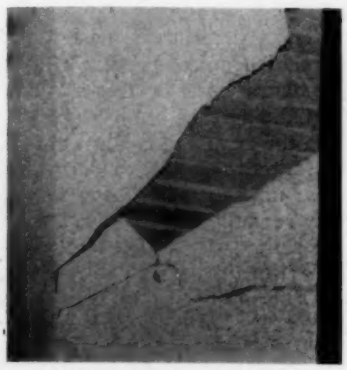
XUM

The Correct Application of Metal Lath to Avoid Plaster Cracks

Results of Tests Recently Conducted at Armour Institute, Showing Best Forms of Application

AS the name indicates metal lath is a metal support or background for plaster or stucco work. Rapid developments in the application and use of metal lath in building construction have been made in recent years and now we find it successfully used in the highest grade buildings. The uses of metal lath are not confined to plaster and stucco work for we find it in many other parts of building construction, such as reinforcement for concrete work. This article, however, will deal with it only as it is used as an improved substitute for wood lath and will call particular attention to recent tests conducted at Armour Institute of Technology by G. F. Gebhardt and J. C. Peebles, for the purpose of determining the best method of application of metal lath to prevent cracks in plaster walls and ceilings.

SAMPLE B-1



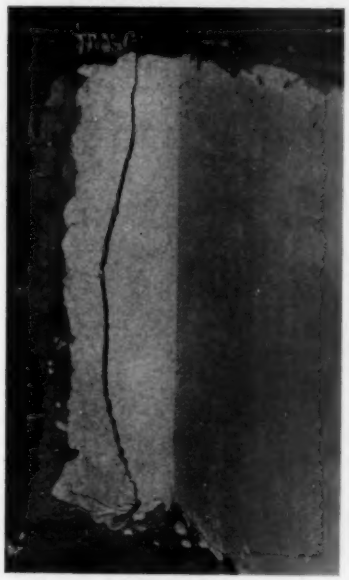
SAMPLE B-X

Crack developed in center of wall and stopped when it reached the corner

In thinking of the results of these tests, let us remember that the purpose of metal lath is for a support for the plaster and not to give any rigidity to the frame-work itself. Many cases will show that where the lath and plaster have been properly applied, a certain amount of rigidity was obtained, but the deflection and failure of the framework under load have nothing to do with the efficiency of metal lath. It is surprising to note, however, that cracks did not appear in metal lath and plaster walls (properly applied) until after the frame work failed, which means that all deflections caused by loads for which the frame was designed will not cause cracks in this type of construction. It is only when overloaded to the point of failure that the cracks will appear.

The fact that expanded and sheet metal lath have enjoyed a greatly increased market in spite of keen competition indicates that it must have many practical advantages. It simplifies construction, is easily and quickly handled and erected, provides better reinforcement for plaster and when properly applied, prevents plaster cracking better than any other lathing.

The results of the tests showed that metal lath should be applied to the ceilings and carried down 6 in. on all walls and partitions. It should not be permitted to butt together in the corners, but should be started one stud away and bent into the corner to avoid a lap there. On walls and partitions, metal lath should be started at the top and carried down, allowing the lower sheets to lap over the upper sheets not less than one-half inch. On the sides the sheets should be lapped not less than ½ in. and tied once with wire between the supports. When channels are spaced on 15¼ in. centers No. 18 gauge black annealed iron tie wire should be used once between supports. No tie wire is necessary when the sheets are lapped ½ in. and nailed or stapled to wood studs spaced on 16-in. centers.



SAMPLE C-2

With cornerite—corner crack developed at deflection greater than maximum allowable

These tests were run in eight series, each series investigating different points of weakness under different forms of construction. Series A, dealing with cracks where side wall and ceiling meet, appeared in THE AMERICAN ARCHITECT, February 16, 1921.

SERIES B—CORNER WHERE TWO PARTITION WALLS MEET.

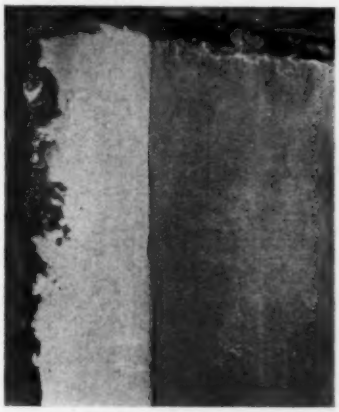
1. Two wood lath partition walls @ 90°; 6" metal lath bent into corner and attached at edges only.
X. Same as 1, except metal lath lap in corner is omitted.
2. Same as 1, but with 6" metal lath strip, 3" on each partition wall.
3. Same as 1, except metal lath lap is attached at both edges and corner.

The test pieces in Series B consisted of two 34" x 36" partition walls, meeting at 90 degrees. The studs were 2" x 4" hemlock spaced on 16" centers. In the testing machine one wall was securely supported from below in a vertical position. The other wall was unsupported and the load was so applied to parallel the condition that maintains when one wall settles and the other remains fixed.

The results of this test were interesting because they showed that where metal lath lap was provided in the corner, the crack developed first in the central wall and in nearly every case was stopped when it reached the corner. It was almost impossible to produce a corner crack. Sample Bx had no lap and corner cracks developed.

SERIES C — SAME AS B EXCEPT ONE WALL IS MASONRY.

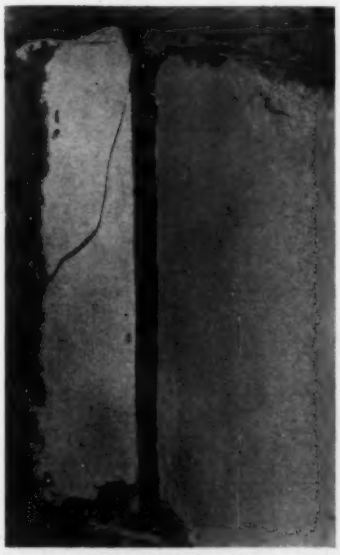
1. Wood lath butting into masonry; cornerite attached at edges only.
2. Same as 1, but with cornerite attached at edges only.
3. Same as 1, without cornerite.
4. Metal lath butting into masonry wall with 6" lap.
5. Same as 4 without cornerite.
6. Same as 4 except metal lath lapped 3" on masonry wall instead of 6".



SAMPLE C-3

No cornerite—corner crack developed at deflection less than maximum allowable

The samples were attached to the interior side of a permanent masonry wall and plastering was carried approximately 12 in. on the masonry wall to provide for a good corner.



SAMPLE C-5

No cornerite—see note Sample C-3

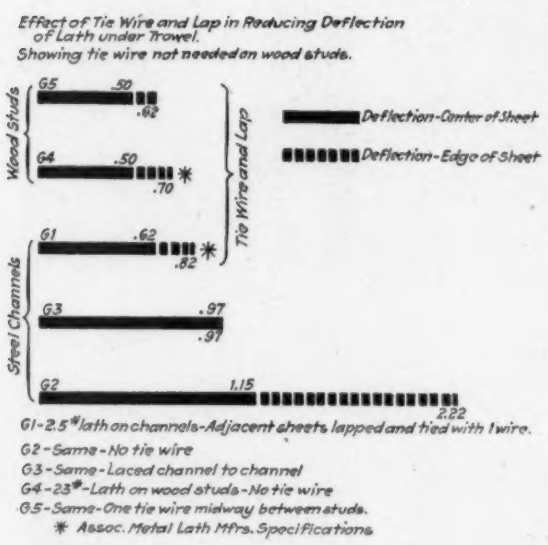
SAMPLE C-6

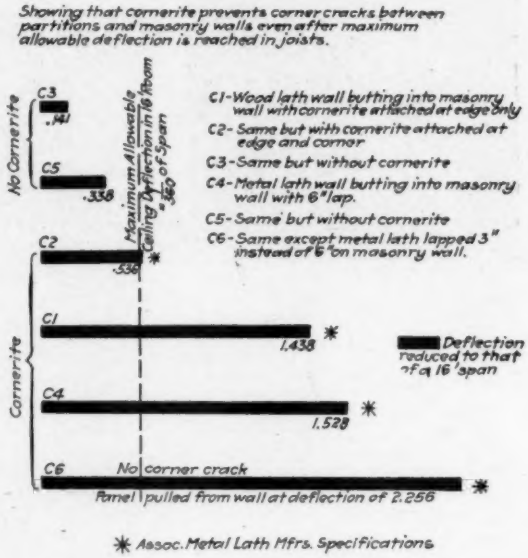
With cornerite—see note Sample C-2

A lifting force was applied to the partition wall giving the same effect as if the masonry wall settled.

The following table shows the upward movement of outer edge of partition wall at which corner crack first appeared, and the numerical order of this crack among all cracks occurring.

Sample	Upward Movement of Outer End of Partition Wall —Inches	Numerical Order of Corner Cracks
C1	0.51	1
C2	0.19	1
C3	0.05	1
C4	0.54	1
C5	0.12	1
C6	No corner crack produced.	


Effect of Tie Wire and Lap in Reducing Deflection of Lath under Trowel.
Showing tie wire not needed on wood studs.
Wood Studs
Steel Channels
Tie Wire and Lap
G5 .50 .62
G4 .50 .70 *
G1 .62 .82 *
G3 .97 .97
G2 1.15 2.22
Deflection-Center of Sheet
Deflection-Edge of Sheet
G1-2.5# lath on channels-Adjacent sheets lapped and tied with 1 wire.
G2-Same-No tie wire
G3-Same-Laced channel to channel
G4-23#-Lath on wood studs-No tie wire
G5-Same-One tie wire midway between studs.
* Assoc. Metal Lath Mfrs. Specifications


Showing that cornerite prevents corner cracks between partitions and masonry walls even after maximum allowable deflection is reached in joists.
No Cornerite
Cornerite
Maximum Allowable Ceiling Deflection in 16' from of Span
C3 .141
C5 .338
C2 .338 *
C1 1.438 *
C4 1.528 *
C6 No corner crack
Panel pulled from wall at deflection of 2.256 *
C1-Wood lath wall butting into masonry wall with cornerite attached at edge only
C2-Same but with cornerite attached at edge and corner
C3-Same but without cornerite
C4-Metal lath wall butting into masonry wall with 6" lap.
C5-Same but without cornerite
C6-Same except metal lath lapped 3" instead of 6" on masonry wall.
Deflection reduced to that of a 16' span
* Assoc. Metal Lath Mfrs. Specifications

The samples without cornerite were much less able to withstand cracking in the corner than those with cornerite and the metal lath wall with 6" lap showed the maximum distortion before corner crack appeared. The wall with 3" lap also showed excellent results, no corner crack appearing, but lath and plaster being stripped from brick wall instead.

Under the test conditions which were as near practical conditions as it is possible to come, the metal lath wall with lap on brick wall, is the strongest to resist corner cracking, while wood walls without cornerite are the weakest.

On the wood wall, the better result was obtained when cornerite was attached at edges only, rather than at edges and corner.

The lath and plaster were not stripped from the brick wall, however, until a deflection was reached which is equivalent to 2.256 inches at the center of a 16-ft. joist. This is far in excess of the maximum allowable deflection in such a joist, which is 1/360 of the span, or 0.533 inch. The same disturbance would follow the vertical settlement of a wall or support 8 feet away from the corner.

Rather interesting observations may be made from this series of tests. It will be noted that both the metal lath and the wood lath without cornerite, samples C3 and C5, show a corner crack at a deflection reduced to a 16 ft. span, which is less than the allowable maximum noted above.

On the other hand, all samples reinforced with cornerite showed no corner crack until the deflection, expressed as above, exceeded the allowable maximum. Even the wood lath, the weakest of the cornerite samples, was safe from corner crack until after the allowable maximum was reached.

SERIES D—PROPER METHOD JOINING ADJACENT SHEETS METAL LATH.

1. Diamond mesh metal lath butted; No. 18 gage iron tie wire once between studs.
2. Same as 1, tie wire laced from stud to stud.
3. Same, lapped ½".
4. Same, lapped one full mesh.
5. Herringbone, lapped selvedge edge only.
6. Same as 5, with one tie wire between studs.
7. "A" lath, lapped selvedge edge only.
8. Same, lapped one full mesh.

In these samples the joint in the lath was horizontal, i. e., at right angles to the wood studs and near the middle of the sample. They were placed on the machine with studs vertical and the load applied in the center vertically downward.

In no case was a crack produced at the edges of the metal lath although the distortion was often sufficient to shear the plaster and lath from the studs.

Vertical cracks were produced in all cases except D8. From the results it was concluded that the method of joining the adjacent sheets had no bearing on cracking provided the sheets were lapped and tied together.

SERIES E—VALUE OF METAL LATH IN JOINING SHEETS PLASTER BOARD.

1. Plaster board with ¼" gypsum plaster in 2 coats.
2. Same as 1, but with ½" gypsum plaster.
3. Same as 2, with 6" piece light diamond mesh metal lath laid on joint before plastering.

The joint between the edges of the plaster board ran horizontally and near the middle of the sample and the load was applied the same as in Series D.

In each sample of this series, a vertical crack through the center of the sample was the first to occur. In sample E1 a break along the edges of the plaster board occurred, when a further distortion was applied. Gypsum plaster ¼" thick does not appear to be thick enough to prevent cracks along the edges, but ½" of such plaster is probably sufficient with or without the use of a metal lath strip laid across the joint. That is to say, with such construction a crack along the edge of the plasterboard will not occur until the distortions are sufficient to destroy the wall.

It is important to put the plaster on to a full ½" in thickness. On account of the difficulty of inspecting the thickness of the coat and the necessity of building up sufficient thickness to prevent cracks it is recommended that specifications call for three-coat work as a practical solution.

SERIES F—MANNER OF SECURING EDGES OF ADJOINING SHEETS OF METAL LATH.

1. 2. # Dia. mesh metal lath on 2"x4" studs.
2. 2.5 # Dia. mesh metal lath on ¾" channels.
3. 3.0 # Dia. mesh metal lath on ¾" channels.
4. 3.4 # Dia. mesh metal lath on ¾" channels.

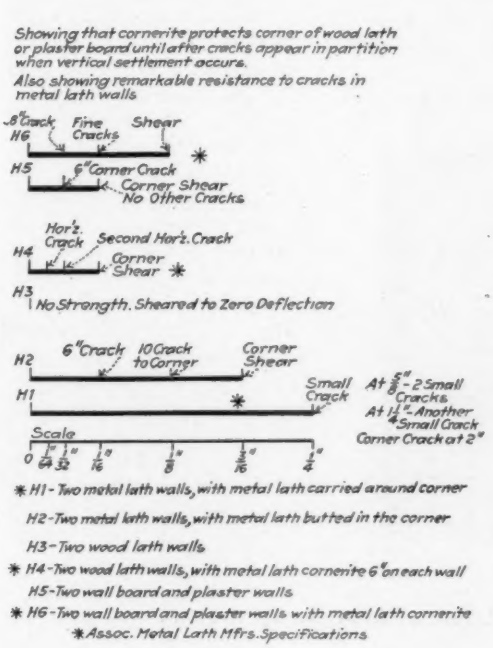
The metal lath was fastened to the wood frame with 4-penny nails spaced 6" apart and was tied to the channels with No. 18 gauge iron wire every 6 inches. Adjacent edges of metal lath sheets were lapped ½" and tied with one tie wire midway between studs.

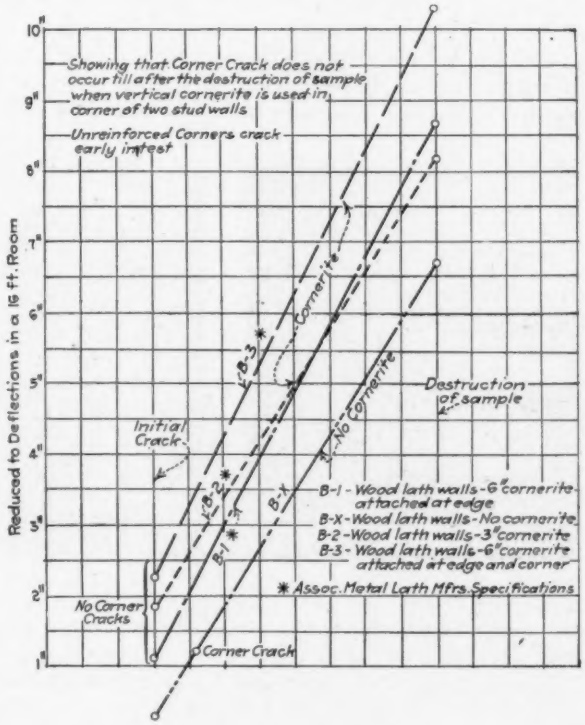
The metal lath was allowed to project 6" beyond each end of the frame. These projecting ends were gripped in the jaws of the testing machine to determine if the adjacent sheets could be pulled apart, before a failure occurred in the projecting ends of the lath which were held in the machine.

It was found that on 2" x 4" studs distortion of the wall will not pull adjacent sheets of metal lath apart if lapped and tied with one tie wire.

On metal channels there is a possibility of pulling the sheets apart, because the lath cannot be secured by tie wires to the channels so firmly as by nails to wood studs. In the former case, a careful securing of adjacent edges becomes important.

The object of tests was to determine the deflection

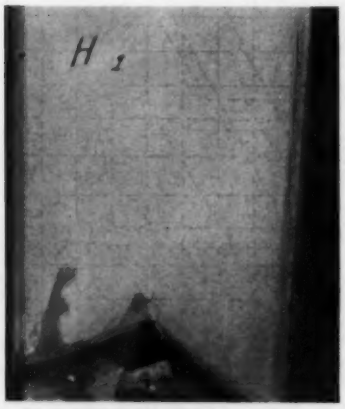

Showing that cornerite protects corner of wood lath or plaster board until after cracks appear in partition when vertical settlement occurs.
Also showing remarkable resistance to cracks in metal lath walls
H6
.8" Crack
Fine Cracks
Shear
H5
6" Corner Crack
Corner Shear
No Other Cracks
H4
Hor'z. Crack
Second Hor'z. Crack
Corner Shear
H3
No Strength. Sheared to Zero Deflection
H2
6" Crack
10 Crack to Corner
Corner Shear
H1
Small Crack
At 5/8" - 2 Small Cracks
At 1¼" Another Small Crack
Corner Crack at 2"
Scale
0
1/64
1/32
1/16
1/8
3/16
1/4
* H1 - Two metal lath walls, with metal lath carried around corner
H2 - Two metal lath walls, with metal lath butted in the corner
H3 - Two wood lath walls
* H4 - Two wood lath walls, with metal lath cornerite 6" on each wall
H5 - Two wall board and plaster walls
* H6 - Two wall board and plaster walls with metal lath cornerite
* Assoc. Metal Lath Mfrs. Specifications


Showing that Corner Crack does not occur till after the destruction of sample when vertical cornerite is used in corner of two stud walls
Unreinforced Corners crack early in test
Reduced to Deflections in a 16 ft. Room
10"
9"
8"
7"
6"
5"
4"
3"
2"
1"
B-3
Cornerite
B-2
B-1
B-X
No Cornerite
Destruction of sample
Initial Crack
No Corner Cracks
Corner Crack
B-1 - Wood lath walls - 6" cornerite attached at edge
B-X - Wood lath walls - No cornerite
B-2 - Wood lath walls - 3" cornerite
B-3 - Wood lath walls - 6" cornerite attached at edge and corner
* Assoc. Metal Lath Mfrs. Specifications

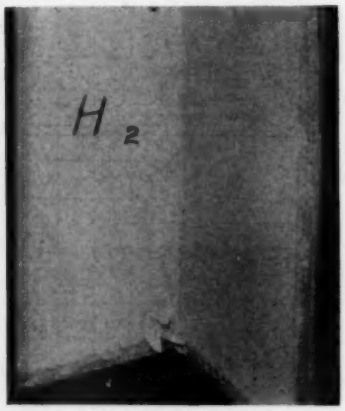
of metal lath produced by the trowel when the plaster is applied, both at the center of a sheet and at the edge where one sheet is joined to the next one.

The results showed that under the conditions outlined, a tie wire used on metal lath on 2" x 4" studs makes but little difference on the deflection produced in the lath by the pressure of the trowel.

When iron channels are used, a tie wire seems desirable, because of the abnormal deflection produced in the sample having no such tie. Structural irregularities will no doubt account for some of the differences noted but after due allowance is made for such irregularities it appears that the edges should be tied when using metal channels. There is not sufficient difference between the results on sample using one tie wire and the laced sample to warrant a conclusion as to which method is preferable. It seems clear, however, that some method of tying should be used.



SAMPLE H-1



SAMPLE H-2

The object of Series H was identical with that of Series B, the only difference being in the method. The forms of construction were as follows:

1. Two metal lath walls, with metal lath carried around the corner.
2. Two metal lath walls, with metal lath butted in the corner.
3. Two wood lath walls.
4. Two wood lath walls, with metal lath cornerite 6" on each wall.
5. Two plaster board and plaster walls.
6. Two plaster board and plaster walls with metal lath cornerite.

In some of the tests it was noted that as the loaded wall was forced downward, the plaster on the supported wall moved downward with it, the two plaster surfaces acting as a unit. This was accomplished by tearing the metal lath away from the studs, thus producing a gap in the supported wall between the upper sill and the top edge of the plaster.

In every case where metal lath cornerite was used, cracks in the side walls appeared before the corner crack. On the other hand (with the single exception of the metal lath walls) the corner crack was the *first* to appear in the samples in which no cornerite was used.

Whenever samples with and without metal lath bent around the corners were tested in the same manner, the comparative results show that cornerite does not induce plaster cracks in the wall surface prior to wall cracks in the samples which did not have cornerite. The metal lath samples, as noted above, were the only exception to this rule, but in order to produce the wall cracks a distortion was required which it would be unreasonable to expect in any safe building.

In the case of the plaster board samples, the walls were composed of a single sheet, and, consequently, there was much less tendency for cracks to develop in the side walls than would be the case where sheets were joined. However, the use of a cornerite in the plaster board samples, increased the load required to produce a corner shear from 3960 lb. to 6700 lb. and the deflection from 1/16 in. to ⅛ in.

The photographs show that two different actions occurred in the samples. As the load was applied, there was a tendency to produce a straight downward movement of the loaded wall, relative to the stationary or supported wall. This action can produce one of two effects:

1st—It may wear the plaster at the corner, thus breaking one wall free from the other.

2nd—If the corner is sufficiently strong, both plaster surfaces will travel down as a unit. This latter effect can only occur in the case of the metal lath by stripping the lath from the studs or in the case of the wood lath, by shearing the plaster keys.

In the case of sample H-1, the latter effect occurred to a notable extent. The downward travel of the surface nailed to the supported wall was 2 in. and the metal lath was completely stripped from the wood without producing a corner crack. In fact, so strong was the corner that no corner crack occurred until the plaster surface, which had been on the supported wall, struck the support on the bed of the machine and consequently could go no farther.

In the case of sample H-2, the downward travel of the plastered surface attached to the supported wall was 3/16". At this point a shear in the corner occurred. It is to be noted in this case that the shear of the corner was a direct result of the load applied, the surface being still free to move.

Short Cuts for Calculating and Estimating Reinforced Concrete

By MILO S. FARWELL.

THE purpose of this article is to show the architect some short cuts that may be used in the solution of problems in reinforced concrete design.

The design data used by the writer will be found in any recognized handbook on concrete work, such as Hool and Johnson, Kidder's Pocket Companion and others. For this purpose the writer will use the nomenclature and formulae found on pages 293 to 296 of the Carnegie Pocket Companion, edition of August 1, 1913. He will show how the various formulae can be transposed and condensed so the designer will understand the use of the constants employed, so he will no longer use design tables without some means of checking the results obtained.

DEFINITION OF SYMBOLS USED

Mc = Moment of resistance of concrete (in.-lbs.)
fc = Compressive unit stress concrete (lb. per sq. in.)
k = Ratio depth neutral axis to effective depth *d*
j = Ratio of lever arm of resisting couple to depth *d*
b = Width beam (in.)
d = Depth beam to center steel in tension (in.)
jd = Arm of resisting couple (in.)
As = Area steel in tension (sq. in.)
Ms = Moment of resistance of steel (in.-lbs.)
fs = Tensile unit stress in steel (lb. per sq. in.)
BM = Bending Moment (in.-lbs.)

Formula 1—For rectangular beams reinforced for tension—

$$Mc = \tfrac{1}{2}\ f_c\ kjbd^2$$

The term $(\frac{1}{2}f_c kj)$ is a constant in the formula, and Ketchum's Structural Engineers' Handbook shows this worked out as 1290. Some engineers use 1280, but either is on the safe side.

$$(\tfrac{1}{2}f_c kj) = \tfrac{1}{2}\ (650 \times .379 \times .873 \times 12) = 1290 \text{ (approx.)}$$

Therefore, $\mathbf{Mc = 1290bd^2}$

This constant can be used for the solution of M_c for rectangular beams and slabs reinforced for tension.

Formula 2—For rectangular beams reinforced for tension—

$$M_s = f_s p\ jbd^2$$

In this formula $(f_s pj)$ is the constant.

Referring to the formulae in the Carnegie handbook—

$$M_s = f_s\ pjbd^2$$
$$= f_s\ Ajd$$

Formula 1 determined the resisting moment due to the concrete, and it is the purpose of Formula 2 to determine the area of steel required for the cross section of the beam or a 12″ width of slab.

Since,

$$M_s = f_s\ Ajd$$

Therefore,

$$A = \frac{M_s}{f_s\ j\ d}$$

$$= \frac{M_s}{1600 \times .873\ d}$$

$$= \frac{M_s}{1396.8\ d}$$

$$= \frac{\mathbf{BM}}{\mathbf{1400 \times d}}$$

A correct solution of a problem will show M_c slightly larger than the bending moment. In solving the problem for the required amount of steel it is advisable to use the bending moment rather than the resisting moment as the value of the bending moment is the amount the steel must provide for.

Formula 3—The shearing stresses in a concrete beam should not be slighted by the designer as many beams fail because of the lack of stirrups.

An easy method of designing the required stirrups is to employ a formula that will assume the size of stirrup to be used and solve for the distance of the stirrups from the face of the supports. The formula given below determines the distance of the first stirrup from the face of the support. By finding the shear at, say, three feet out from the end of beam the distance of the stirrup at that point is determined. Approximate the stirrups between there and the face and diminish the number toward the center of the beam to correspond to the value of the shear at the point of the stirrup. Stirrups are usually ⅜″ or ½″.

Regardless of the number of stirrups about 40 per cent. of the bars should be bent up at an angle of 45 deg. or less. The bend at the top should end not less than one foot from the supports.

Distance in inches of the first stirrup from the face of the support—

$$= \frac{\mathbf{2 \times (area\ of\ stirrup \times f_s \times d)}}{\mathbf{(shear\ to\ be\ taken\ by\ steel)}}$$

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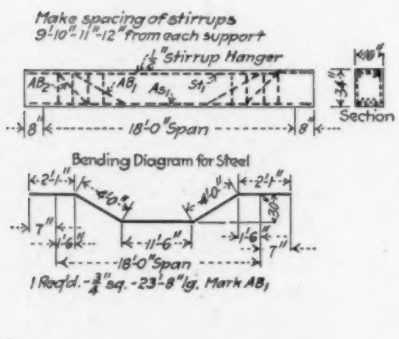
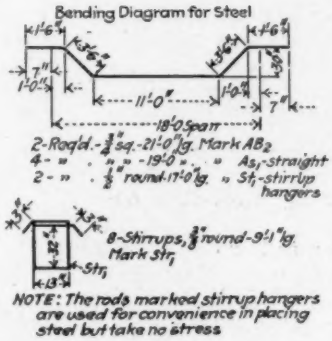
This formula is derived from the data given in Vol. 1 of Hool's book on reinforced concrete.

An item often overlooked in the design of concrete beams is the bending diagrams for the steel bars. These should be shown to be sure the bars will be bent correctly.

The application of these formulae to a practical problem is as follows:

Problem—Assume a simple beam of 18-ft. span which is to carry a uniformly distributed load of 60,000 lbs. Neglecting the weight of the beam, find the size of beam required and the area of steel necessary.





Solution—Bending moment $= \frac{W \times L \times 12}{8}$

$= 60000 \times 18 \times 1.5$

$= 1{,}620{,}000$ in. lbs.

(By formula 1)

$M_c = 1290 \times b \times d^2$

Before solving for M_c assume a size for the beam. In this case we assume a beam 16" wide by 34" deep.

$M_c = 1290 \times 1\text{-}1/3 \times 32 \times 32$

$= 1{,}761{,}280$ in. lbs.

Note that the value of M_c is larger than the bending moment. If M_c had been smaller than the bending moment, then a larger beam would have been tried.

(By formula 2)—

Sq. in. of steel required for the beam

$= \frac{\text{Bending moment}}{14000 \times d}$

$= \frac{1{,}620{,}000}{14000 \times d}$

$= 3.3$ sq. in. required

Use seven ¾" sq. bars having an area of 3.9 sq. in., three to be bent up and four to be straight.

The accuracy of the calculations is shown by finding the compressive stress in the concrete under the given conditions of loading.

$$f_c = \frac{2 \times \text{bending moment}}{j \times kb\ d^2}$$

$$= \frac{2 \times 1{,}620{,}000}{.873 \times .385 \times 16 \times 32 \times 32}$$

$= 480$ lbs. per sq. in.

This is less than the allowable stress of 650.

The beam should now be provided with the proper stirrups to take care of the shear. The concrete in the beam will resist a shear of 40 lbs. per sq. in. The equivalent load is 60,000 lbs. and the maximum shear is one-half or 30,000 lbs.

Maximum shear	30000
Shear to be taken by the beam (16x32x40)	20480
Shear to be taken by stirrups which are ⅜" round (area .11 sq. in.)	= 10520

(By formula 3)

Distance of first stirrup from face to support

$$= \frac{2 \times .11 \times 14000 \times 32}{10520}$$

$= 9$"

Make the first stirrup 9" from the face of the support.

By interpolation check the spacing at a distance of three feet from the face of the support.

Shear 3 ft. from face

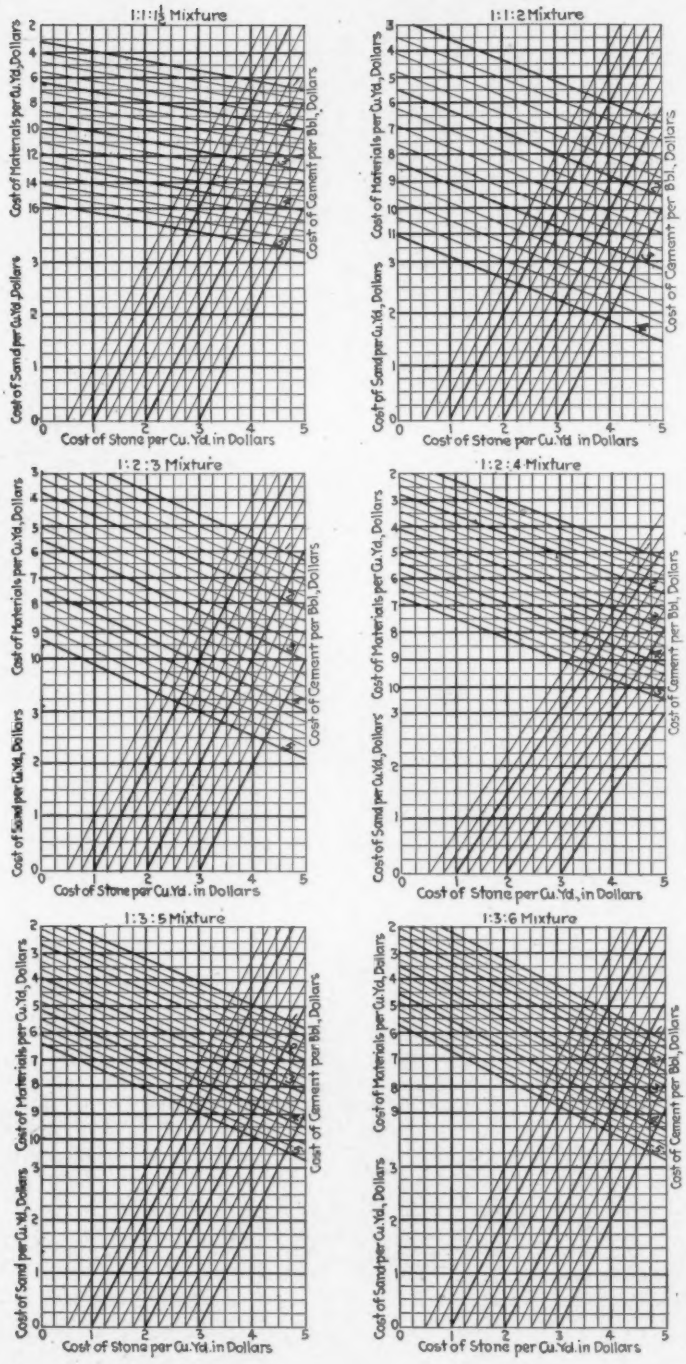
$= 6/9 \times 30000$

$= 20000$

But the beam is good for 20480. Therefore, the stirrups can die out at that point.

On the following pages are some useful charts drawn up by George C. Habicht, showing costs of concrete materials and form work per cubic yard for varying costs of labor, lumber, stone, cement, sand, etc. The explanatory notes indicates clearly any assumptions that have been made as well as the method of using the charts.

Cost Materials—Concrete

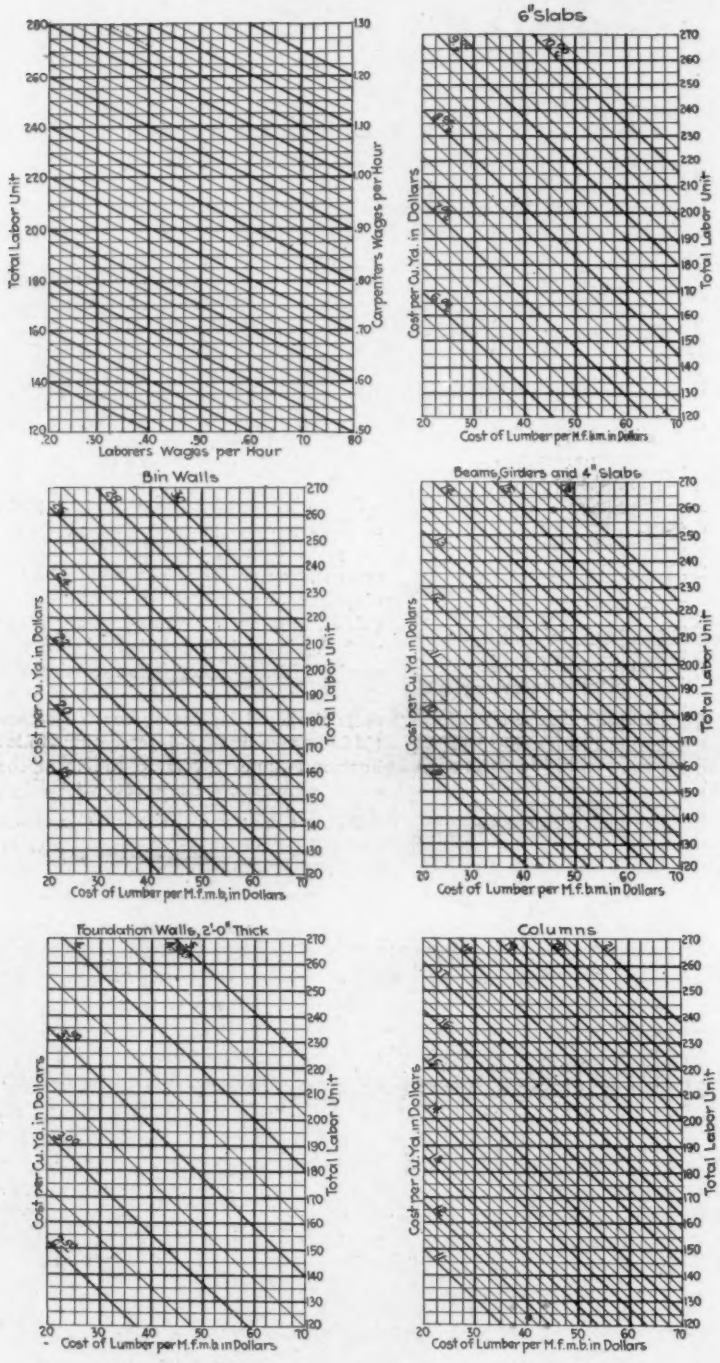

1:1:½ Mixture
1:1:2 Mixture
1:2:3 Mixture
1:2:4 Mixture
1:3:5 Mixture
1:3:6 Mixture
Cost of Materials per Cu. Yd., Dollars
Cost of Sand per Cu. Yd., Dollars
Cost of Cement per Bbl., Dollars
Cost of Stone per Cu. Yd. in Dollars

TO USE CHARTS

Assuming a 1:2:4 mixture and prices of $2.00 per cu. yd. for stone, $1.50 per cu. yd. for sand, and $3.00 per bbl. for cement, enter the chart at bottom diagonal line indicating cost of stone ($2.00). Follow diagonal to intersection with horizontal line indicating cost of sand ($1.50). Thence follow vertical line through this intersection until it intersects diagonal indicating cost of cement ($3.00). From that intersection follow horizontal line to left to the total cost of all materials, $6.62 per cu. yd.

1 bb. cement = 3.8 cu. ft. % voids in stone or gravel = 45. Cement costs are net; bags are not included.

Cost Form Work—Concrete



TO USE CHARTS

Assuming carpenters' wages 90c. and laborers' wages 50c. enter chart at 90c. and follow horizontally to intersection with vertical line through labor wage of 50c. The diagonal line through this intersection gives the labor unit, 230. For beams and girders enter chart at 230 labor unit and follow horizontal line to intersection with vertical line through lumber cost, say, $50 per M ft. b. m. The diagonal through this intersection indicates $14.58 total cost form work per cu. yd. concrete.

Curves are based on using lumber three times.

The Wisdom of Building Now

What the general public needs, and more particularly at this time, is education as to the exact truth of the present building situation. This education should, of course, come from those elements in the building industry most competent to instruct. Unfortunately, the architects have not, as they very well might, taken the lead in this important campaign. There is no ethical reason why they should not. The bar on advertising having been removed architects as individuals or collectively, through their representative bodies may by a series of well composed advertisements place accessably before the public the exact conditions at this time and the probable outcome in the future.

General contractors throughout the country have been doing this work of education, and to good purpose. A skilfully directed scheme of advertising by a representative firm of contractors has appeared in the New York daily press.

Well written, terse statements are made, attractively set forth with small "cuts." The following is an example of the text:

> Maybe you're sitting tight, instead of building a new factory or warehouse now.
>
> You know materials are on the bargain counter and that competition is keen, but you're hoping the bottom will drop out the same as it has in some other lines.
>
> Will it? How about the homes, hotels, office buildings, etc., that simply must be built next Spring and Summer?
>
> If you need a new factory or warehouse, build it now for *Economy*.
>
> 'Phone Bryant 2908.
>
> BARNEY-AHLERS
> Industrial Construction
> *"Speed with Economy"*

If general contractors find it worth while to pursue such a campaign of education, would it not be equally worth while for architects everywhere to pursue a similar course?

The Standard of Living

An Index to National Prosperity, It Must Be Maintained

According to R. Goodwyn Rhett, of Charleston, South Carolina, a former president of the National Chamber of Commerce, the future of American Democracy depends in a very large measure upon the kind of housing program the United States adopts at this time to relieve the present shortage of one million and a half family dwellings.

"In taking up the various phases of the problem of making up the shortage of houses," says Mr. Rhett, "we cannot afford to overlook or disregard the bearing which such construction will necessarily have upon the permanent welfare of this country. We cannot afford to countenance or permit any backward step in the standards of living which have been established either by law or by public opinion—for the standard of living of the great mass of the people is the surest index of progress in the march of civilization."

Good Housing Hurt by Shortage

The Evil Rises Through the Ranks, Affecting All Types of Living Places

Endless proofs can be drawn from the literature of Housing Reform to show the demoralization, physical and moral, the dulled minds that accompany bad housing, says Julia Lathrop, chief, Children's Bureau, Department of Labor. The worst evil of a great housing shortage is that it tends to make all housing bad. It crowds indecently, it tolerates the use of abandoned and condemned buildings. It makes unscrupulous owners and landlords charge excessive rentals, ruinous to the tenants. The existing good housing deteriorates under the strain.

Building with Government Aid

Foreign Countries Encourage Construction

A list of the continental countries whose parliaments have provided or are considering measures to protect tenants and to encourage building homes, includes Spain, Germany, Czecho-Slovakia, Austria, Hungary, Belgium, the Netherlands, Switzerland, Finland, Norway, France, Sweden. Naturally the countries in this list which are most depleted by the war are those which need houses most and are least able to build. In Berlin, Moscow, France, Warsaw, Budapest, all housing capacity is carefully measured and strictly rationed according to the size of the family.

Upbuilding the Nation

Why, inquires Senator Calder at the Chamber of Commerce Housing Council, have we not used a larger part of our surplus labor and materials for the upbuilding of our national plant, built more houses so that rents may be lowered; improved our railroads so that our goods can be promptly moved to market, improved our terminals, our coastwise shipping and our inland waterways?

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Teach Housing in Schools

Ignorance On This Subject Breeds Indecent Conditions

The principles of housing should be taught in our schools high and elementary, and in our churches of every creed, states Julia Lathrop. Housing is as truly the concern of statesmanship as commerce, industry and agriculture, and international relations. No citizen should be able to escape some knowledge of what housing means and therefore what shortage means.

A housing shortage inevitably lowers living standards. Its effect upon industry is to lower the health, resistance, efficiency of workers and to repel workmen from localities where decent housing is unobtainable, or to make them restless and wretched if they find themselves tied to a location which gives them and their families less than a decent shelter in decent surroundings.

To Reduce Excessive Building Costs

Resolutions Covering This Topic Passed By National Chamber of Commerce

BE IT RESOLVED, That we call upon all persons engaged in the business of manufacturing building materials of every class and character, as well as upon builders and contractors, to exert their utmost efforts to the end that conditions are brought about which will result in immediate reductions in costs of construction.

That we call upon the retailers and distributors of building materials to do their full share in meeting the demand of the people for cheaper building materials. That we call upon labor engaged not only in the construction industry, itself, but in the making of the great variety of materials of all kinds entering into construction, to do its full share, to the end that labor costs, which constitute so large a proportion of the total cost of raw materials and of building, may decline to a point where it will be possible to proceed with construction which is so essential to the health, comfort and well-being of all the people.

That the Chamber of Commerce of the United States make such study of the housing problem, including costs of materials and labor entering into house construction, as will locate the responsibility for excessive costs, and publish its findings so that all may know where the responsibility lies.

For a National Building Code

Chamber of Commerce Suggested as Medium

The Chamber of Commerce of the United States is in a position where it can very well serve the people by formulating modern, economical, simple building regulations in the form of a code and by concerted effort have this code established in many cities or by state legislatures as a substitute for present codes which in many ways are objectionable because these codes take the form of specifications rather than prohibitions. The reason for having hundreds of building codes in hundreds of different cities is not evident. *The time is ripe for a National Building Code,* especially in the simple types of buildings about which I am speaking. A start has been made and this effort should be continued, stated W. H. Ham, manager of the Bridgeport Housing Co., before the National Housing Conference of the Washington Chamber of Commerce.

Housing Resolutions Passed

National Chamber of Commerce Sums Up Efforts

BE IT RESOLVED, that we, as representatives of American business, urge that each constituent member organization of the Chamber of Commerce of the United States in co-operation with the National Chamber—

1. Make, or cause to be made, a thorough study of the situation in its own community which will bring out the facts as to house overcrowding, erection of unfit houses and changes in house plans or construction that tend to rob the dwelling of its character as a home.

2. Based upon the results of such study adopt a constructive program designed to secure adequate and wholesome housing for all the people.

3. Set minimum standards for light, ventilation, water supply, sanitation and proper construction and maintenance for all dwellings; and take such action as may be necessary to make its conclusions effective.

Housing Problem in America

"Housing Problems in America" is the name of a cloth-bound volume of 386 pages, issued by National Housing Association, as a report of the proceedings of the Eight National Conference on Housing, held in Bridgeport, Conn., December 9, 10 and 11. While practically a carefully edited collection of the various important papers read at these meetings it is at the same time a valuable analysis of living conditions past and present with forecasts, based on undeniable authority of the probable trend of these operations in the future. This volume affords that large number of people who were not able to attend these sessions a comprehensive idea of all the important matters discussed and will be a valuable addition to the architects' working library.

Art Historian Dies

Dr. Max Dvorak, the famous art historian of Vienna University, is dead at Grusbach, Moravia, says a Berlin despatch to the London Times.

Poverty of Immigrants

On three steamships which I inspected recently there were 1,100 persons with only $1 in their possession. During Christmas week 8,000 arrived with less than $20, and 4,000 with no money at all.—Frederick A. Wallis.

Boston Architectural Show

Exhibit Now in Progress at Rogers Building

The annual joint exhibition of the Boston Society of Architects, the Boston Architectural Club, and the Society of Landscape Architects, at the Rogers Building, 491 Boylston street, now in progress, will continue through the rest of the month.

It has been the aim of the committee in charge to make the exhibition as comprehensive and interesting to the public as possible. To this end there are exhibits by representative architects outside of Boston who have been especially invited because of the quality and distinction of their work, among whom will be Paul Cret, John Russell Pope, Betram G. Goodhue, Peabody, Wilson & Brown and others.

There will, of course, be the exhibits of the best work from the offices of the Boston architects, comprising drawings, water-colors and photographs of current work and many models of buildings under construction.

A large part of the exhibit of the Boston Society of Landscape Architects is under the auspices of the American Federation of Art, and will prove of great value and interest to the public. The great hall of the Rogers Building has been decorated under the direction of the landscape architects, and serves as a setting for the sculpture exhibit.

The Boston Architectural Club exhibit comprised the work of its atelier, in connection with the Harvard Architectural School, Massachusetts Institute of Technology and Beaux Arts Institute of Designs.

The Allied Arts exhibits contain selections of furniture, hangings, rugs, fixtures, sculpture and garden appurtenances.

The Society for the Preservation of New England Antiquities has comprehensive exhibit of photographs, models and drawings of early New England houses.

The Harvard Architectural School, the Massachusetts Institute of Technology, the Cambridge School of Landscape Architecture and the Rhode Island School of Design are also represented.

Architects Join National Group

San Francisco Men Affiliate With National Congress of the Building and Construction Industry

Local architects and contractors are considering identifying themselves with the National Congress of the Building and Construction Industry, as the result of the talk made regarding that rapidly growing organization by R. D. Kohn of New York City at the luncheon meeting of the San Francisco Chapter of the American Institute of Architects, in honor of Henry H. Kendall, president of the American Institute of Architects.

At the meeting were: G. J. McGilvray, president of the Builders' Exchange; C. A. Day, Chamber of Commerce; Charles W. Gompertz, General Contractors of San Francisco; C. H. Snyder, San Francisco Section, American Civil Engineers; acting Mayor Ralph McLeran, G. A. Applegarth, Ernest Coxhead, J. S. Fairweathers, Morris M. Bruce, W. B. Faville and William Mooser.

At the conclusion of the talk by Mr. Kohn, President G. A. Applegarth, representing the local chapter, appointed a committee to consider local co-operation with this movement.

Revamping the Tenement

Bridgeport Expert Suggests Methods for Civic Associations to Pursue

Most of our cities have tenements below decent living standards. The manifestly practical thing to do is to revamp these, saving the structure itself, but bettering the condition of living by alterations which will furnish opportunities for wholesome living. In order to do this, advises W. H. Ham, of Bridgeport, the simplest and most effective improvements can be made in the surroundings of the building by the introduction of domestic equipment for the household utilities, intense development of the ground space and the introduction of modern plumbing in the house itself and, in many cases, letting in the sunshine through the introduction of properly placed bay-windows or sky-lights and by the wholesome use of paint, inside and out.

In order to make a program of this form of development, some association must undertake the actual reconstruction of some group of tenements which are now below the level of American living. It will, of course, be argued that these additions will raise the rent, but with associated efforts, I am convinced many of these in all of our cities can be operated on a commercial basis today and pay a proper return on the increased value.

Such a program carried to its correct conclusion must introduce a relation between landlord and tenant which will bring about the response on the part of

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the tenant to the decent living conditions provided and which will have its reaction in the proper care of the property so as to reduce to the lowest possible limit the maintenance charges. A very large amount of education is necessary in this particular, but I am thoroughly convinced from our own experience that the results are very easily obtained when the proper disposition on the part of the landlord is most clear to the people.

Summing up our problem briefly, we find that the blight of selfishness has laid a withering hand on the building business. There have been covered frauds by the cheap speculative builder, excessive interest rate charged by the money lender and low return in shirking labor. The industry is hampered by bad laws, both written and unwritten, and by unfortunate customs and compromises on the part of the builders associations and trade unions. These influences are extremely subtle and far reaching, and can be best counteracted by civic associations like the Chamber of Commerce.

Beauty and Utility

A Proper Interdependence Urged Upon the Community

A house must of itself be an expression of the beautiful. Craving for beauty is one of the deepest rooted of human instincts. Mr. R. Goodyn Rett, of Charleston, S. C., discussed this before the recent Washington Housing Conference. We find it, he stated, existing in the geranium pot on the dingy tenement window sill; in the diamonds of the newly rich; in the silver spurs of the cow-boy, etc. If thwarted, it produces restlessness and discontent, the cause of which is often not recognized by the sufferer himself.

If we recognize clearly the value of beauty we shall achieve beauty with utility. America has just passed through an era extending over a generation or more in which utility was lauded, given almost exclusive attention, in which beauty was often thought to be in conflict with utility and because of this considered impractical. This was an era of ugliness in which the suppressed craving for beauty often found grotesque expression—for it could not be suppressed entirely—in decorating essentially ugly things with ornaments. It was the era of the false front.

Gradually we awoke to the realization that this was not beauty, that beauty is expressed in form, in line and proportion, not in superimposed ornament. The lines of greatest strength are lines of beauty; ugly lines are weak lines. Ugliness is the mark of failure, of a half done job, of haste and ignorance.

In our housing we must talk utility. We must talk health and sanitation. These are essential, practical, every day matters which must be considered. But if we stop there, if we produce only a bare, uninviting, clean habitation then we shall have failed not only to realize the possibilities of the house as a home, but we shall have failed even to secure full utility, full sanitation. In our clean-up campaigns, the campaign that ends with a bare desert of backyard instead of a garden, fails. It is work that must be done over and over merely to attain a negative result. But when the refuse-filled back yard has been transformed into a garden, which the family can develop and enjoy, then the work is done. So when our unfit dwellings have been transformed into homes when beauty and comfort take the place of ugliness and squalor then the job is done. Then there has been injected the spirit that creates, that impels us to move forward.

Architects to Compete

Manhattan College Invites Six to Submit Plans

To obtain the most artistic and serviceable designs for its new college buildings on the site near Van Cortlandt Park, the trustees of Manhattan College have invited six prominent architects to submit plans in a competition. These firms are: Starrett & Van Vleck, James W. O'Connor, Edward F. Fanning & Philip L. Goodwin, Murphy & Dana, Raymond Hood, Bacon & Delehanty Association of New York City and Maginnis & Walsh of Boston.

Each of the competing architects will receive remuneration. An administration building, college and high school buildings, gymnasium and athletic field are to be constructed. It is planned to start work early in June. About $1,000,000 is now available.

The college for many years has occupied a large plot at Broadway and 131st street.

Weekly Review of the Construction Field

With Reports of Special Correspondents in Regional Centers

The Architect's Relation to Price Declines

Architects Should Teach the Building Public Some of the Fundamental Economic Laws—Treasury's Savings Associations Offers a Field for Immediate Co-operation

F. E. Davidson, President of the Illinois Society of Architects, practically summed up what may be said here, in this sentence:

"What every student of economics should do, what every architect *must* do, is to teach the building public some of the fundamental economic laws."

The business of teaching a "public" what to do is not an easy matter, and is not susceptible to a list of actual things to be done. It is a vague sort of thing, viewed off-hand; but it becomes very tangible, if studied.

For example, every architect is undoubtedly aware of the Treasury's recently formed loan associations. This organization is offering Treasury certificates in such denominations that they will probably be taken up by the workers of this country. One of the most popular of those denominations is the $1.00 unit, which is deducted from workers' pay envelopes every week. This is not a dream, nor is it impractical. Millions of dollars worth of these certificates are being bought every week by workers, all over the country. If 5,000,000 workers had substracted from their pay that $1.00 per week, the yearly total would be about $240,000,000. And what is necessary to get the 5,000,000 workers to agree to buy those certificates? Nothing more than a sufficient number of people to *sell* the idea to the people.

The Government now has a trained corps of men in this work, but they are not enough. Why should not every architect in this country do what he can, in his spare moments, to quietly sell that idea? It is a solid thing, backed by the Government. And it is capable of producing millions of dollars of savings (a great deal of which is going into savings banks, to be put out into mortgages and commercial real estate loans). It is a scheme capable of producing money by the hundreds of millions, and a great deal of that money would go into institutions which lend on real estate.

This is not a "fundamental economic law" in the strictest sense of the word, but it is good economics.

There are innumerable instances such as this one, and in them is summed up the architect's relation to price declines. A general price decline must be met by constructive economics, by quiet, persistent, propaganda for whatever may successfully and actually tend to meet that decline and offset its effect.

An architect can think of a number of things which are susceptible of this sort of activity. In them is summed up the architect's relation to price declines.

Some Vital Questions Answered

Where Is Building Increasing and Where Decreasing? Are Banks Lending? Have They Money to Lend? Are They Well Loaned Up? Is There a Shortage of Raw Materials Sufficient to Curtail Production?

The Fidelity and Deposit Company of Maryland recently made a nation-wide survey of the United States, and in that survey every section and almost every conceivable worth-while question was covered. The whole thing was done by telegraph, and the investigations conducted by hundreds of men who were either trained in precisely that sort of work or thoroughly familiar with conditions in their respective cities or towns.

The American Architect has been observing the various sections of the country covered by this national survey, and finds that these conditions exist today:

According to the report of the Fidelity & Deposit Co. building operations are *increasing* in New England, South Atlantic, East South Central, West South Central and the Pacific sections of the country. They are *decreasing* in Middle Atlantic, East North Central, West North Central, and the mountain sections.

As to the question, "Do the Banks Appear to Have Funds to Lend and at What Rates of Interest," this proves to be the case:

Yes, in every section of the country mentioned above, and at from 6 to 8 per cent. in those sections, with the exception of West South Central, where it runs 8 to 10 per cent., the Mountain, where it runs 8 to 12 per cent., and the Pacific, where money may be had at from 8 to 10 per cent.

In every part of the country banks are "well loaned up."

In all sections of the country except the Mountain and Pacific there is a shortage of coal, but this is being rapidly remedied in the following sections, improved transportation being the factor: New Eng-

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land, East North Central, East South Central, South Atlantic, Middle Atlantic and West South Central.

In no part of the country was it found that there is a shortage of raw materials sufficient to curtail production. This is even more true today.

(*Special Correspondence to* THE AMERICAN ARCHITECT)

SEATTLE.—It would appear from quotations received this week that not all steel manufacturers entertain the same standards of measuring the outlook, particularly in sheet metal used in construction. Jobbers of the Pacific coast were advised of quotations of $5 per ton less on sheet metals, all lower prices coming direct through outside mills. A similar situation prevailed a week ago, with the exception that at that time outside mills were handling their price reductions by means of middlemen. This week there is no hesitancy about the source.

Jobbers are inclined to believe that even though outside mills trim prices of sheets there will be no participation by the Corporation, whose basic prices are believed to be now in force. Statements of unfilled tonnage would serve to corroborate this impression and to make it reasonably certain that enough demand is in sight for the first two quarters of this year, or up to the fall when building commitments decline normally in volume, to warrant present prices. This view seems to have been shared in to a marked degree by investors, and it is certain that architects on the coast are doing all possible to intensify the impression.

The market for galvanized pipe is unchanged. Stocks are now close to what they have been at this time of the year since 1914 and would seem to border closely on normal. The jobbing trade is able to report prompt delivery, with considerable pressure from the mills in the direction of increasing sales. Jobbers are of the opinion that pipe has sounded bottom. Back orders that might be classed as unfilled have been cleaned up, and no builders are now waiting for pipe material to complete work on construction. Halves and three-quarters, which have been short when other sizes were plentiful, are now here in sufficient volume to take care of all requirements.

The supply of brick, patent roofing, plaster, cement and plaster board is plentiful on a stationary market. Coast jobbers viewed with some surprise this week the statements in some of the construction trade journals that prices of cement had been lowered. Their report is that they are paying the same basic costs that have prevailed for 90 days and back into the early fall. Undoubtedly the manufacturers in the north coast territory have reserve stocks on hand that would constitute a surplus and lower market, but they are not offering more than the market can easily absorb.

Surveys of the fir lumber holdings in what is known as the West Coast forest products territory of Washington and Oregon by wholesalers this week indicates clearly that despite the heavy accumulations of lumber as a whole, the stocks that are customarily used to make up eastern yard assortments for building purposes are badly broken. Long dimension is short. Flooring and ceiling are short and dry boards are approaching a clean up in many of the mill yards. The result of this discovery is a stiffening of the market on these sizes and on practically all uppers or finishing esentials despite a softer feeling in the east.

Buyers of the East who draw their lumber supply by rail have delayed so long in preparing for the Spring trade that when they get on the market they will find conditions much stronger in many of the sizes that they could have bought sixty days ago on an easy market.

About 60 per cent. of the fir mills and 40 per cent. of the cedar mills of this territory are now in operation. Red cedar shingles are quiet, and the mills do not care to accept business on this market. Shingles are now under the cost of patent roofing and a splendid competitive angle is therefore offered, but it is evident from the small volume of orders received that the trade is not yet ready to buy.

The farthest that manufacturers and wholesalers of lumber and jobbers of steel and construction materials are willing to forecast the construction revival of the nation is June 1, and there are many indications that there will be a material change for the better by April 1.

(*Special Correspondence to* THE AMERICAN ARCHITECT)

CHICAGO, February—The building boom of 1921, which has been looked forward to with great interest in Chicago, is not going to be a "dud" by any means, but the conviction is growing that it will not be as big as some of the optimists would have the general public believe.

There there will be building activity goes without saying, but the activity is not going to be as feverish as at first anticipated. The feeling now is that the building revival will sort of stretch itself out for two or three or even five years and that the revival will not really reach peak before 1922.

Expert opinion regarding 1921 seems to simmer the situation down to a considerable volume of home building, a good increase in apartment construction, a pretty fair share of public building and very little industrial construction. Just at present activity continues to remain in the planning and inquiry stages with some improvement, however, in the building permit chart.

Architects continue to report that most of the business is in prospect rather than actually on the boards,

but the arrival of Spring, it is expected, will bring about a marked improvement in the situation.

Chicago owners, real estate agents and tenants continue to fight the battle of higher rents. Thus far, the argument has resulted mainly in a lot of newspaper talk, some proposed state legislation and nothing much else. Nobody has been moved, apparently, to get busy on any wholesale apartment project, apartments being rather conspicuously absent from the building permit lists of recent weeks.

The obstacles in the path of building resumption, as has been repeatedly mentioned in AMERICAN ARCHITECT, seem mainly to be the continuing high price for building materials and labor. Labor in the Chicago building trades—said to be 65% idle at present—declines to accept less than the $1.25 per hour wage schedule which prevailed during the flush times of the past two or three seasons. Building materials, other than lumber, also seem to be holding up. A convention of building supply manufacturers held this week at a Chicago hotel brought forth the statement from more than one leading manufacturer that building materials are not apt to be much cheaper for some time to come. This statement was made to apply particularly to items such as sand, concrete, brick and other materials which are used in road construction. The basis of the statement was that such materials are being diverted to highway construction, thus taking the burden of depression off the market to a considerable extent.

The public has been holding back and is still holding back on the matter of prices, believing that by waiting a few weeks that prices of construction would be relatively lower. Statements such as have been made at the builder's supply convention and the statements accredited to labor leaders have a tendency, apparently, to determine prospective investment builders to let the whole plan wait for another season. The home builder is not so fortunately situated. Between the Scylla of the high rents and the Charybdis of the high construction costs, he gives evidence of preferring the latter course, with the result that the building of homes, both pretentious and plain, will be one of the principal lines of activity during the early Spring.

Suburban building is being given rather special emphasis. Real estate men along the north shore, which is the residential strip for the wealthy Chicago commuter, report considerable demand for residential sites and the same demand, in perhaps lesser degree, is reported in other of the better suburbs. Plans have just been announced for the early construction of twenty bungalows at Glenn Ellyn, a western suburb and this announcement is regarded as a harbinger of many similar announcements in the immediate future.

Another impetus to the building of homes of frame construction will be recorded if the city council acts favorably upon a proposition now before it to render the fire limits more elastic and thus to permit the construction of wooden buildings in territory now forbidden to buildings of this character.

This proposition is rather strongly opposed by the Illnois Society of Architects. Acting through F. E. Davidson, president, the Society proposes certain revisions of the building code to permit the cheaper construction of brick or concrete bungalows, rather than a revision of the fire restrictions, which the Society believes should be opposed by those interests having at heart the future of the city.

"As a matter of cold figuring," Mr. Davidson insists, "a brick bungalow can be built today at approximately the same cost as a frame building of the same dimensions, in detail and with the same finish."

The question of amending the fire restrictions is now before the council, the matter having been officially brought before the council at the suggestion of the Carpenters' Union.

The home building idea will doubtless be greatly encouraged by the "Own Your Home" Exposition, which will be held at the Coliseum from March 26 to April 2. The Exposition proposes to show the average flat-dweller that the ownership of a modern home is within his financial scope and ability. Co-operating industries are working in close harmony to make the Exposition an absolute success and preliminary preparations are already well out of the way. One of the exhibits will be the collection of small house plans and designs. The exhibit will comprise fifty designs submitted in the nation-wide architectural contest. The three prize-winning designs—the best gathered in the $15,000 contest—will be exhibited.

It is the rare week in Chicago, during recent months, when somebody does not come to the fore with a plan for solving the housing shortage painlessly. The recent week brings a project for "poured" houses of four rooms to be built at a cost of $2,100 each. Mayor William Hale Thompson has bestirred himself in behalf of the "poured" house proposition and is interested in the first set of one hundred which is to be platted in an addition to Oak Park, a Chicago suburb. It is the contention of those who favor the plan that such houses can be built from cellar to garret—both cellar and garret being conveniently absent—in seventy-six hours, at a cost of $2,100 each. The owner is to acquire the house on the payment of $100 down and the remainder in some such convenient sum as $20 or $30 a month. The project is being watched with interest, not only by newspaper paragraphers, but by the building industry.

There has been very little price adjustment in the local market either in lumber or other building materials. As far as lumber is concerned, the prices

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that have prevailed for some time are still in effect, the demand for spot turnover of lumber being negligible, though subject to some improvement in recent days. Building materials are showing greater strength and more activity, though prices have been subjected to very little change. Present values in the materials field are about as follows:

	Per Bbl.
Portland cement	$2.55
This price does not include sacks, which are $1.00 a bbl. extra.	
	Per Yard
Torpedo—Lake and bank sand	$3.50
Crushed stone, grav. screenings	3.50
	Per Ton
Hydrated lime, Ohio, paper	$21.00
Hydrated lime, Ohio, cloth	29.00
Including sacks at 30 cents each	
Hydrated lime, Wis. paper	19.00
Bulk lime	1.65
Neat plaster	20.00
Prepared plaster	15.00
Magnesite Stucco, base coat	50.50@55.00
Do finished coat	50.00@55.00
Dashes (all kinds)	28.00@40.00
Wood fibre	20.50
Prepared finished	36.00
Face brick—	
Standard, vitrified red	32.00@34.00
Smooth, Indiana red	38.00@40.00
Smooth, Ohio red	38.00@40.00
Smooth Pennsylvania red	46.00@48.00
Smooth, buff	45.00@47.00
Smooth, grey	47.00@49.00
Rough, buff	44.00@46.00
Rough, grey	47.00@49.00
Variegated, rough texture	34.00@49.00
These prices delivered by truck from cars:	
Common brick	$13.00@16.00

(Special Correspondence to THE AMERICAN ARCHITECT)

BOSTON.—To stabilize the building industry in Connecticut, to regulate conditions of contracts and to discourage the charging of "outrageous rates of interest on money loaned by banks and others to prospective builders" are some of the announced purposes of a State Building Contractors' Association which has just been formed at Hartford. It has an initial membership of more than 300 contractors, representing building, plumbing, electrical, roofing and other construction trades.

Members of the association include members of builders' exchanges established in several Connecticut cities who have recognized that mutual interests have been injured and the building trades hampered by certain contractors outbidding others by paying a few cents more an hour to employees, with the result that while one contract might be hurried to completion, another quite as important might not be completed within the time limit. It is proposed to put a stop to "stealing" each other's help, also to establish such a level of wages for employees, in all lines of the building trades, as will permit a necessary readjustment of the business to a peace-time standard. That it will be necessary to reduce the general wage scale from 20 to 25 per cent. is the opinion of the members.

It is estimated that 80 per cent. of the employed men in the building trades are unionized and that in Hartford alone, about 3,000 men would be affected by a new scale of wages. The builders want it to be distinctly understood that they do not wish to antagonize labor, but they do want to stimulate a volume of building which they believe would be sure to come if some of the obstacles were removed. Furthermore, they plan to insist upon abolishing the bonus system attached to building loans, and will advocate some plan whereby building operations may be more easily financed.

Things in New England seem to be working towards a period of greater stability in prices, in wages, in internal and international affairs which will no doubt have a highly beneficial effect on our business welfare. "Whether one takes an optimistic or pessimistic view of the future," says one observer, "largely depends on whether he is viewing these readjustments and uncertainties by themselves, or as preparations for a greater and more prolonged period of commercial prosperity in the future."

TOMB OF BEATO PACIFICO BUON, CHURCH OF SANTA MARIA DEI FRARI, VENICE, ITALY